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Wanted—Practical Recognition

LAST week, Mr. L. W. Orchard, Clerk & Treasurer of the British Transport Officers' Guild, wrote to the *Evening News* on behalf of officers and senior staff of the British Transport Commission and its divisions. Mr. Orchard stated that, far from forming a keen and contented band intent on making a success of the modernisation scheme, many older railway officers were looking forward to retirement. Younger men were praying that promotion would not in effect mean that their salaries would become further de-valued by the application of too low an increment and/or by de-grading. Salaries and salary ranges would have to be considerably improved if the prevailing depression, discontent, and frustration among railway officers was to be removed and the small number of men who carried such great responsibility for the railways' future was to be revitalised to a consciousness of former high standards and pride of office. Disappointed hopes, shaken or destroyed loyalties, and the feeling of wasted effort were among the evils which had resulted from nationalisation and were factors which contributed to inefficient management. Energy, imagination, and enterprise—the qualities essential to a good executive—had to be paid for. Mr. Orchard wrote on behalf of men not covered by the Guillebaud inquiry and therefore outside the machinery of negotiation for conciliation staff. Until now, their salaries have been subject to less formal negotiations than those leading to adjustments in wages, and have invariably followed those adjustments. In present conditions of new thought regarding railway pay as a whole, there can be no doubt that the British Transport Commission recognises the important part played in the smooth running of the railways and allied activities by members of the Guild. Nevertheless, it may be that some time will elapse before practical attention is paid to their monetary situation. In Mr. Orchard's own words, it would be better if necessary adjustments to officers' salaries do not, as in time past, have to be forced out of the Commission by a process of "cat-and-dog wrangle."

Mr. A. T. Gandell's Extension of Office

THE New Zealand Government Railways are to benefit from the continued guidance of Mr. A. T. Gandell, C.B.E., General Manager of Railways. After 40 years of railway service, Mr. Gandell was due for retirement this year, but, as recorded elsewhere in this issue, he has accepted an invitation of Mr. M. Moohan, Minister of Railways, to continue as head of the Railways Department for a further three years. In making the announcement the Minister expressed his appreciation of his willingness to do so, and pointed out that the continuity in the day-to-day control of railways is particularly important when so much development in the rail-transport field is taking place. The Minister expressed the view of many when he said ". . . Mr. Gandell's extended term of office will be well-received by the public and railwaymen alike." At 55, Mr. Gandell is still a comparatively young man, and it is most gratifying that his wide experience and acknowledged leadership in this large and important industry is to be retained. He has been General Manager since 1955, and was awarded the C.B.E. in last year's Birthday Honours.

Publicising British Exports

PUBLICITY for the contribution by British manufacturers and exporters to the development of Africa is to be considered by one of three sub-groups set up by the Export Publicity Council, itself established at the end of last year under the chairmanship of the Minister of State, Board of Trade, Mr. F. J. Erroll. The group, led by Mr. Hubert Oughton, of W. S. Crawford Limited, is inquiring whether British manufacturers and exporters are publicising adequately what they are doing for countries which have recently become, or are about to become, independent or are achieving a greater degree of self-government. Another group, convened by Sir Walter Worboys, of the Federation of British Industries, is to investigate whether British industry is organised and informed enough to take full advantage of publicity opportunities in and to the other six countries of the European Free Trade Association. A third group, under the guidance of Mr. Brian Rootes, of the Dollar Exports Council, will examine what more can be done by British exporting firms and trade associations to help the 700 overseas correspondents in London who report to their own countries on British industry and commerce.

Equitable Charges

MISREPRESENTATION of British Railways was carried far by the author of letters published recently in several daily newspapers. British Railways, he complained, had charged him £3 1s. 11d. for conveying a calculating machine from Bristol to Manchester, a road transport firm would have charged 13s. 4d., and the second class passenger fare was only £1 12s. 6d. He also stated that "almost never can machines of this calibre be sent by rail without sustaining damage in transit, regardless of the most exacting packing." Mr. C. J. Rider, Public Relations & Publicity Officer of the Western Region, has pointed out that the consignor insisted on despatch of the machine by passenger train at "company's risk"; that he could have obtained the same service at the owner's risk rate of £2 5s. 5d.; that overnight delivery by goods train was available for only 11s. 8d.; and that the costs of handling, barrowing and sorting a 114-lb. crate at each end of its journey and the facility of speedy conveyance by passenger train are reflected in the rate. British Railways must charge

rates which will enable it to pay its way. To state that damage to fragile consignments as almost universal is fantastic; claims in fact have greatly decreased.

Overseas Railway Traffics

EAST African Railways & Harbours total earnings from railway and harbour services in the month of January, 1960, were approximately £2,239,000 compared with £2,306,000 in the same month last year. Railway earnings were £130,000 and harbour earnings £46,000 above the level estimated for the month. The approximate railway revenue amounted to £1,797,000, a decrease of £66,000 compared with last year's figure, which was a record month. The decrease was due mainly to a fall in revenue from goods traffic of £87,000. There were increases of £5,000 in receipts from passenger services, £8,000 from livestock traffic, and £10,000 in miscellaneous receipts. Railway operating revenues of the International Railways of Central America for January amounted to $1,150,116 compared with $1,383,248 in January, 1959, a decrease of $233,132. The net revenue from railway operations was $68,246 ($225,517) and the net income $40,190 ($98,732).

Progress in Israel

ELIMINATION of steam traction and installation of C.T.C. were the major developments on the Israel Railways last year. The system is the only main line railway in Europe and the Near East to be worked exclusively by diesel locomotives and railcars. All main-line locomotives have been fitted for radio telephony. More automatic barriers with flashing light signals and warning bells have been installed at level crossings. The current for one of these is generated by a windmill specially built on the site, and that for the rest is taken from the grid. Late evening trains have been introduced between Tel Aviv and Haifa and Jerusalem. The railway parcels service and door-to-door transport of consignments of up to 4 tons, inaugurated in 1959, are reported to be competing successfully with road transport. Work continues on construction of the line to the Red Sea port of Eilat. Timber sleepers would have to be imported, and the concrete ones used are manufactured locally.

Commercial Problems in Malaya

REPLACEMENT of steam by diesel-electric locomotives, resulting in better services, is given by the management of the metre-gauge Malayan Railway as one reason for the recovery of traffic in the latter half of 1959. An improvement in the general economic position helped considerably. Railway revenue for 1959 is estimated at $60,400,000, against $58,460,000 for the preceding year. The tonnage of goods is higher than ever before. Much of the route is paralleled by excellent roads, and road competition is severe. Goods rates generally are producing a low revenue per ton-mile. It is estimated that if the railway earned the same revenue per ton-mile as had resulted in 1956, the additional revenue would be $5,000,000 in the year if traffic were maintained. The tax recently imposed on fuel and diesel oil increased operating costs by $3,500,000 a year; revision is stated to have been under consideration. If the tax is not reduced or abolished increases in passenger and goods rates might be necessary—a difficult problem in view of the competitive position.

Railway Delegation to Germany

SIR John Benstead, Deputy Chairman of the British Transport Commission, and Mr. Sidney Greene, General Secretary of the National Union of Railwaymen, are among the members of a nine-man delegation from the British Railways Productivity Council which will visit Germany during the early part of next week. The Commission's other delegates are: Mr. J. Ratter, Member; Mr. A. Dunbar, Manpower Adviser; Mr. C. S. McLeod, Director of Industrial Relations; Mr. L. J. Hamblin, Industrial Relations & Welfare Officer; Mr. E. J. Larkin, Director of Works Study, and Mr. C. P. Hopkins, General Manager of the Southern Region of British Railways. Mr. W. J. Evans, acting General Secretary of the Associated Society of Locomotive Engineers & Firemen, is the ninth member of the party. The delegation will study motive-power depots, goods handling sheds, and new marshalling yards. A Commission spokesman has stated: " German railways are more advanced in modernisation than we are, and the members of the party will be on the look-out for new ideas." This is not the first time in recent months that British railway officers have studied German installations—visits have also been paid during the past year by members of the North Eastern Region's staff.

Proposed Solution of U.S.A. Suburban Problem

WHAT may prove to be a pioneer scheme for rapid transport in suburban areas in the U.S.A. is being tried in Philadelphia. A non-profit chartered corporation has been set up to operate all local services within the metropolitan area of the city hitherto belonging to the Reading Company and Pennsylvania Railroad Company. These transferred to the corporation recently the working of all the commuter services. The corporation guarantees the railways an annual fee for using their tracks. The amount of the fee depends on the revenues collected within pre-determined maximum and minimum figures. The railways are also granted specified subsidies, and the city underwrites the difference between operating costs and the return required to show a profit. It will be interesting to see how this novel re-organisation of such integrated suburban services succeeds, and whether it will be adopted by other American cities.

Nickel Alloys in Industry

CLOSING at 5 p.m. today, March 25, the second London exhibition of Henry Wiggin & Co. Ltd. at Park Lane House, 45, Park Lane, W.1, offers help to engineers and designers in making the best use of the company's specialised high-nickel alloys. It will be followed by other exhibitions abroad, opening in Milan. The company's alloys fall into four main groups: corrosion-resistance, heat-resistance, electrical-resistance, and materials with special physical properties. These are demonstrated, and correct methods of fabrication are shown. Industrial applications are also indicated by a large selection of components, sub-assemblies, and finished parts. Henry Wiggin & Co. Ltd., which has been in continuous operation for 125 years, is concentrating on complex alloys today. To keep abreast of technical requirements, personnel is being increased, particularly in the Metallurgical Department. Also, the company's activities are being modernised and concentrated at Hereford. There are few industries in which Wiggin alloys cannot play a part—a railway example is the use of Ferry nickel-copper alloy for instrument and control resistances in electric locomotives.

Edinburgh—Aberdeen in Three Hours

USE of two Type "2" 1,160-b.h.p. Bo-Bo diesel electric locomotives in multiple unit has made possible re-introduction from April 4 of a 3-hr. schedule for expresses of British Railways, Scottish Region, between Edinburgh Waverley and Aberdeen. Two restaurant car trains each way on weekdays, the 8.5 a.m. and 5 p.m. from Edinburgh, and the 7.30 p.m. and 4 p.m. from Aberdeen, are to run on this schedule, with stops at Dundee Tay Bridge, Arbroath, Montrose and Stonehaven; and other diesel-worked services over the route are to be accelerated by up to 35 min. The locomotives, built by the Birmingham Railway Carriage & Wagon Co. Ltd., and incorporating the British-built 1,160 b.h.p. Sulzer engine, coupled to a Crompton Parkinson generator, were described in our issue of November 28, 1958. The last 3-hr. schedules between Edinburgh and Aberdeen were steam worked, in the 1939 summer service, with five stops northbound. New trains presumably will be heavier. Also to be introduced next month is an improved service of multiple-unit diesel trains, totalling some 40 additional workings daily, between Edinburgh and Kircaldy and Dunfermline.

Spreading the Holiday Traffic Load

APPOINTMENT by the Government of a committee to study the extension of the holiday season is welcome, as is any step to relieve the strain on the railways and on the hotel and allied industries. Mr. John Rodgers, Parliamentary Secretary to the Board of Trade, stated last week that the committee would include representatives of the Ministry of Transport,

Treasury, Ministry of Education, Ministry of Labour, and the Scottish Education Department; and the Welsh Office, the Government of Northern Ireland and the British Travel & Holidays Association would be associated. The short period in which school holidays are concentrated is a chief reason why families go away in July and August. Re-consideration by the education authorities at national level may result in extension of the school holiday season. Hotels are reported to be increasingly willing to accept bookings from mid-week. One cause of the public preference for travel at week-ends is the desire to make the most of an annual fortnight, though this may lessen with the realisation of the greater comfort of mid-week travel. Issue by British Railways of mid-week tickets is helping to mitigate the difficulties, but their solution lies mainly outside the field of transport.

British Railways' Last Steam Locomotive

PRIDE was justified last week in the locomotive erecting shop at Swindon Works, Western Region, at the naming ceremony of *Evening Star*, a standard Class "9" 2-10-0 No. 92220, the last steam locomotive to be built by British Railways. Welcoming the guests, Mr. R. F. Hanks, Chairman of the Western Area Board, British Transport Commission, said that by producing this last one, the works had seen through to the end a job started 118 years ago and continued by a great band of Swindon craftsmen. No other product of man's mind had ever exercised such a compelling hold on the imagination of the public; no other machine, in its day, has been a more faithful friend to mankind, nor has contributed more to the cause of industrial prosperity in this, the land of its birth, and throughout the world. The ceremony was a fitting tribute to the steam locomotive, so human and so gentle, and yet, when unleashed, capable of such noble power and strength.

More Diesel Locomotives Ordered by B.T.C.

IN pursuance of the British Transport Commission policy of exploiting the advantages of diesel traction in areas in which steam power is to be replaced entirely, an order has been placed with the English Electric Co. Ltd. for a further 20 2,000-h.p. Type "4" diesel-electric locomotives. This is one of the most powerful main-line types to be ordered for the railway modernisation programme, and more than 60 are now in service. Since September, 1958, the first 10 English Electric locomotives of this type have averaged a weekly mileage of 2,500 each, and up to the end of last year the total for all 10 on scheduled passenger services was well over 1,500,000 miles. The design of the locomotive is based on the prototype main-line diesel-electrics put into service in this country between 1946 and the beginning of the modernisation programme. Its success is largely due to the background of joint design experience gained on these prototypes by the English Electric Co. Ltd. and railway engineers responsible.

Channel Tunnel Proposals

THE prospective growth of accompanied motorcar traffic through a Channel Tunnel was apparent from the traffic forecast made for the Channel Tunnel Study Group by the Economist Intelligence Unit, of London, in association with French and American groups. This was explained last week by Mr. M. A. Cameron. Principal Officer (Administration), British Transport Commission, in his paper to the Institute of Transport. Train working proposed by the study units would be much as suggested in our March 11 issue. Through passenger trains would run between London and Paris (in 4 hr. 20 min.) and Brussels, but it would be necessary, assuming an interchange station near the British portal, to provide there facilities for passengers to change from British trains to those of Continental loading gauge. Because of wind pressure and of the danger of open doors in single-track tunnels, motorcars would have to be conveyed in covered vans, to allow speeds of 70-80 m.p.h. The twin bores would be self-ventilating. Four sequence crossovers would facilitate maintenance and avoid a crossover at the mid-point, where a neutral section is required for reasons of electric power supply. The paper gave rise to an exceptionally animated discussion in which representatives of railway, shipping, and air transport undertakings took part.

British Railways Electrification Conference

THE world-wide interest being shown in the development of high-voltage electrification and its application to British Railways is reflected in the excellent response to invitations to attend British Railways Electrification Conference. More than 100 engineers from overseas railway administrations have already accepted invitations to the conference which, as recorded in our issue of November 6, 1959, will take place in London during the first week in October.

Over 40 papers on technical aspects of the 25-kV. a.c. system of railway electrification will be presented at the conference, at which delegates will hear about developments taking place in this form of traction as applied to British Railways. The conference will be supported by an exhibition of electric locomotives and traction equipment at Battersea from October 3 to 9.

The opening paper of the conference will be given by Mr. S. B. Warder, Chief Electrical Engineer, British Railways Central Staff, under the title Electrification in the modernisation of British Railways; the choice of the 50-cycle system. This will be followed during the week by 10 papers read by the authors, while the remaining papers, which will be printed and distributed, will be discussed but not read at the conference. Papers are being prepared by technical officers of the British Transport Commission and the railway Regions, as well as by the directors, chief technical managers, engineers, or designers, of many manufacturers in the British electrical and locomotive industries. The subjects will range over locomotives and multiple-unit trains, power supplies and distribution, civil engineering, interference problems, signalling and telecommunications, instrumentation and measurement, switchgear, and the catenary overhead system. The summing up will be by Mr. R. C. Bond, Technical Adviser to the B.T.C.

The papers will be printed and distributed beforehand to all delegates attending the conference. Later these papers will be printed in full in the bound proceedings, which will also include the full discussion on each paper. Details of the papers and their authors are given on page 374.

While the various papers will undoubtedly foster keen interest in the progress being made with 50-cycle electrification in Britain, it is to be hoped that the subsequent discussions will yield a wealth of opinion and experienced comment which will be of material advantage to all parties concerned.

Railway Administration in the Tropics

PROGRESS made in the administration and operation of railways in tropical Africa and Asia, and the contrast in methods, were outlined by Mr. D. Dyer Bartlett in a paper read recently to the Bristol (British Railways, Western Region) Lecture & Debating Society. Mr. Bartlett, after training and service on the Great Western Railway and the Western Region, was Assistant Superintendent, East African Railways & Harbours from 1948 to 1952, and Chief Operating Superintendent of that system from 1952; in 1955 he was appointed Deputy General Manager of the Malayan Railway, of which he subsequently became General Manager, retiring last year.

When he arrived in Dar-es-Salaam, Tanganyika, in late 1948, he states, the problem was the integration of the Tanganyika Railway with the Kenya & Uganda Railway to form the new East African Railways & Harbours administration. These two systems became, in May, 1948, an inter-territorial service administered by the East African High Commission. They ceased in effect to be Government Departments and became responsible to a Commissioner for Transport, who is a member of the High Commission. Their affairs were no longer matters for national politics and in Kenya, where, he observes, politics is almost a national hobby, this meant that the new railway administration was freed of much unwelcome pressure, some bureaucracy, and much adverse publicity from time to time. The first Commissioner incidentally was Sir Reginald Robins, another G.W.R. Special Trainee, to whom is due much of the credit for the events leading to the creation of the unified railway system of East Africa.

To advise the Commissioner, a Transport Advisory Council was established with members nominated by the respective East African Governments. It worked through several committees including the Railway Committee and the Ports

Committee. The General Manager of E.A.R. & H. was Chairman of both, and was under the obligation to submit to them matters such as organisational changes, expenditure on new works, and annual estimates, for approval. Until 1952 the General Manager administered the system through six Heads of Departments: Superintendent of the Line, Chief Engineer, Chief Mechanical Engineer, Chief Accountant, Superintendent of Ports, and the Stores Superintendent. From January 1, 1952, the Superintendent of the Line's Department was divided into two departments: Commercial and Operating. The last Superintendent of the Line was Mr. (now Sir) Arthur Kirby, yet another G.W.R. Special Trainee, who was later General Manager of E.A.R. & H. and is now Commissioner for East Africa in the United Kingdom. At that time five former G.W.R. trainees were occupying senior positions on railways in East Africa.

Whilst in Tanganyika Mr. Bartlett discharged dual responsibilities to the General Manager and to the Superintendent of the Line. As Regional Assistant for Tanganyika he was responsible to the General Manager for public relations, liaison with the Government and public bodies, and was also the co-ordinating Officer in Tanganyika for the various departments of the railway administration. Dar-es-Salaam is over 600 miles from headquarters at Nairobi and communications were often unreliable. He was responsible to the Superintendent of the Line for the operation of his Department pending the establishment of District Offices. This included the operation and maintenance of the lake and road services in Tanganyika and the hotel Services. In 1952, when he transferred to Nairobi as the first Chief Operating Superintendent, considerable progress had been made with the integration of the two railways, and the Heads of Departments in Nairobi were in a better position to administer their departments in Tanganyika. Communications had improved and there had been a continual interchange of staff between the two countries.

In Malaya the organisational pattern was generally similar but quite different in practice. The General Manager of the Railway Administration is also General Manager of the Railway and Port Boards, which under the Railway Ordinance of 1948 advise the General Manager, and not the Minister, on matters of policy. The General Manager, Mr. Bartlett points out, is not bound to accept their advice, though he cannot act in opposition to the advice given without reference to the Minister. In practice, however, there was no divergence of views, as the matters only put before the Board were those submitted by the General Manager, often after informal discussions with Government officials. The Malayan Railway Administration also is not a department of the Government but an autonomous self-accounting public authority responsible to the Legislative Council through the Minister of Transport. Both administrations are required to administer the undertakings on commercial lines and, "taking one year with another", to balance their budgets.

As regards appointments to the more senior posts on the railways, in the Operating Department in East Africa in 1953 there were 10,350 staff, of which 331 were Europeans, with the middle strata posts filled by 1,510 Asians. The Europeans occupied all senior and key posts without exception, whilst the Africans in all the lower grade posts were making slow progress. With the general improvement in the standard of education, the Africans now joining the Administration are thought likely to be able to discharge the responsibilities of much more important positions. Mr. Bartlett believes that, with the grant of some form of self government, the process must be greatly accelerated.

In Malaya the progress made by the Malayans was marked, and between 1954 and the present time it has gone much further. Although the Malayan Railway is a relatively small undertaking, in 1957 and 1958 over 100 of its staff went overseas to the United Kingdom, Australia, Japan, or India for training of different kinds. No other railway can approach this figure in relation to the size of the administration. By the end of 1959, after the achievement of independence in 1957, there were only a dozen British officers left with the undertaking. Malayans, which term includes Chinese and Indians domiciled in Malaya, apart from the Malays, are already occupying the senior positions. A Malay, Dato Ahmad bin Parang, is General Manager designate and a Chinese, Mr. Chan Peng Khuen, is now the Chief Mechanical Engineer.

There are schemes of service for all grades from porter upwards, which lay down minimum qualifications. A porter, for instance, must be able to read Malay; the General Manager must be a professional officer with Head of Department experience, and so on. The method of progress and rate of progress is clearly defined. All promotions are by examination or selection, usually both, and are made by the Railway Service Commission which is an independent body appointed by the Paramount Ruler, with absolute powers.

At the present time the Malayan Railway has one of the finest fleets of diesel electric locomotives and diesel electric railcars of any railway of its size and resources in the world. It was the first railway outside America to introduce air-conditioned sleepers, the first in what were then colonial territories to use large coaching vehicles on a metre-gauge line, and one of the first to introduce road feeder passenger services. It now has long sections of welded rails giving rise to important maintenance economies, and the rebuilt Sentul Workshops have been described as among the best in Asia. The introduction also of diesel-electric railcars powered by six cylinder Rolls-Royce engines developing 220 b.h.p. at 1,800 r.p.m. was revolutionary for a railway with its financial resources. The use of stainless steel and laminated plastic and the motive units chosen have aroused much comment.

In East Africa, emphasis, Mr. Bartlett states, has been to concentrate on improved Garratt locomotives to move the heavy traffics from the coast, though main-line diesel electric locomotives are on order. Competition from other forms of transport in Malaya is now comparable with that in Britain and the signs are that similar problems are now facing the East African administration, as is stated in recent annual reports. In Malaya well over 80 per cent of all goods traffic is now carried at special rates and this is expected to continue indefinitely. Both administrations operate classifications and a rating structure on the traditional British lines although important refinements have taken place in recent years. There has been the inevitable tendency to move away from "What the traffic will bear" and to concentrate more on costs of operation.

L.T. & S. Line Station Improvements

MODERNISATION on the London Tilbury & Southend line of British Railways, Eastern Region, will not only result in a new electric train service operating at 25kV. 50 cycles a.c. in 1961, but will also entail the reconstruction of several of the stations along the route.

At Rainham, for example, a completely new station will replace the existing wooden premises which have been in constant use for more than 100 years. It will be built on a level site, east of the existing station, with the main entrance on Ferry Lane. The new station premises will be situated on the down side of the line, and will consist of a ticket and parcels office, combined booking hall and waiting room, bookstall, station master's office and other facilities.

Parcels traffic will be dealt with over a special loading dock well clear of the entrance to the station. A glass-fronted waiting room will be built on the up platform, which will be reached by a footbridge. A feature of the new station will be the facilities for nearly 60 bicycles under cover while a car park will be made available in the approach from Ferry Lane. In addition, both platforms will be long enough to accommodate eight-car electric trains.

At Benfleet a new building, housing a booking hall and ticket and enquiry office will be built on the up side of the line, to replace the existing facilities on the down side. A pedestrian subway is being constructed linking the Canvey Island and Benfleet sides of the railway.

A new booking hall and ticket and parcels office is to be constructed on the up side of the line at Westcliff-on-Sea. Other accommodation, including the waiting room and stationmaster's office, will be renovated. At Upminster, all the station buildings at street level are to be replaced by a completely new structure, comprising booking hall ticket and parcels offices, and storage accommodation for some 200 bicycles under cover. Platforms 1 and 2 have already been lengthened to take 12-car trains and the canopy of No. 1 platform is being extended. Substantial improvements will also be made to the accommodation at other stations on the line.

Ten stations, Laindon, West Horndon, Dagenham Dock, Low Street, Rainham, Shoeburyness, Barking, Stanford-le-Hope, Thorpe Bay, and Purfleet, are in the process of being equipped with electric lighting for the first time. Fluorescent lighting is also being installed at Tilbury Riverside, Stepney East, East Tilbury, Southend East, and Upminster Stations.

Another feature of the modernisation programme, already well under way, is the lengthening of station platforms along the line to accommodate eight or 12-car electric trains. Stations concerned in this work include Stepney East, Benfleet, Leigh-on-Sea, Chalkwell, Westcliff-on-Sea, Thorpe Bay, Low Street, Stanford-le-Hope, Southend Central, Fenchurch Street, Barking, West Horndon, Laindon, Pitsea, Shoeburyness and Grays.

The new programme marks a further stage in the task, begun some years ago, of renovating many of the stations along the line to bring them in line with the standards of cleanliness and efficiency expected by the travelling public from electrified services.

Extending the Scope of U.K.R.A.S.

THE United Kingdom Railway Advisory Service was established last autumn to help the railway administrations served by the United Nations Economic Commission for Asia & the Far East to solve problems in all spheres of railway activity, to inform them of technical developments in progress and planned on British Railways and in the industries supplying material to railways in Britain and overseas, and to enable railways in the area covered by E.C.A.F.E. to profit by the experience of British railway technical staff. The service functions under the auspices of the International Inland Transport Branch of the Ministry of Transport, with the co-operation of the British Transport Commission, British Railways and the railway equipment industry. A Member of the Commission, Mr. John Ratter, is concerned specially with arranging liaison with British Railways. The range of activities covered is wide, and includes commercial questions.

The scope of U.K.R.A.S. has now been enlarged to embrace countries beyond the sphere of E.C.A.F.E. The latter includes nearly all Asia from Persia eastwards. Recently the Sudan Railways and those of other countries have been able to avail themselves of the advisory service. The way in which U.K.R.A.S. is helping railways overseas is shown by the visit to Britain last week of Senor Luis Falcone, Chief Engineer (Signalling) of the Chilean State Railways. His inspection of some British Railways signalling and other installations and electrification works, and of the plants of British manufacturers of signalling equipment is recorded elsewhere in this issue. Senor Falcone had been invited by the Federal German Government to visit railway installations and the works of manufacturers of railway equipment in Western Germany. U.K.R.A.S. invited him to Britain and arranged a programme extremely comprehensive within its time limits, and of great value to Senor Falcone and his colleagues in Chile in considering signalling, marshalling yard, electrification and other equipment for the State Railways, notably in connection with electrification at 3,000 V. d.c., now in progress, of the 250 miles from Santiago (Alameda) to Chillan; this project was described in our issue of April 11, 1958.

Most of what he saw, newly developed techniques and works recently completed, including the remote control at Wilmslow, London Midland Region, was already in operation. Now that the modernisation of British Railways is well under way, there is much to see, and much information compiled after observation of equipment in action, which would not have been available a year or so ago. British Railways' shop window, displaying the products of British industry, ingenuity, research, and experience, is being filled with new goods of proven quality. As Brigadier A. E. M. Walter, Chairman of U.K.R.A.S. and Head of the International Inland Transport Branch, Ministry of Transport, pointed out at the dinner to Senor Falcone last week, the advisory service was not set up until railway modernisation had advanced enough for Britain to have new works and equipment to show in operation, and information on them and on new techniques and processes digested and ready for those who might inquire. In addition there is an immense fund of knowledge among railwaymen and in private industry, built up over the years, which is available to administrations in countries overseas which lack the knowledge gained from long experience of operation of the heavily-trafficked railways of Britain and of manufacture here of material for railways throughout the world.

The enterprise shown by the British Government, the Locomotive & Allied Manufacturers' Association, and the B.T.C. in making known the achievements and potentialities of British design and workmanship of motive power is shown in the colour film, " British Locomotives," with a commentary in nine languages. The Spanish version of this was shown to Senor Falcone last week, as was the B.T.C. colour film of British Railways modernisation, and copies of both films were presented to him.

Uncertain Outlook for Railway Freight

(By a correspondent)

IN January industrial output was running about 10 per cent higher than a year earlier. The production of iron and steel was approaching new records, which were set up in February. Shipbuilding and repairing lagged somewhat, but engineering and other heavy industries were busy. Though coal output declined, domestic coal was in demand and the National Coal Board found markets for some of its surplus stock. On the whole, conditions favoured a revival of railway freight traffic, but the improvement on the poor tonnage handled in 1959 did not go far to strengthen the railway financial position.

In four weeks to January 31, our railways originated 20,615,000 tons of freight train traffic. That was an increase of 2,023,000 tons, or 11 per cent, on 1959, but 1,791,000 tons, nearly 8 per cent, below the carryings in the January period of 1953. The railways worked 1,491 million ton miles, 88 million, or 6 per cent, more than last year. The comparable figure for 1953 was 1,724 million, a difference of 233 million or 13.5 per cent. Revenue from freight train traffic was £1,103,000 more than in 1959. That increase of 5 per cent would be obliterated by the rise in operating costs caused by the general advance in railway salaries and wages dating from January 11.

For the first time since 1948, there was a small increase in merchandise and livestock traffic last year. In January a substantial rise of 449,000 tons, or 17 per cent, took place. The total carryings of 3,123,000 tons were, however, 640,000 tons, or 17 per cent, below 1953 and 1,224,000 tons, or 28 per cent, below 1949. In moving the additional traffic the railways worked 58 million, or 15 per cent, more ton miles. As gross receipts were only 8 per cent higher, it would seem that a good deal of traffic was won by reducing rates. Operating costs will mount steeply this year owing to revised scales for salaries and wages, so that the gain in net revenue may be trifling.

Minerals accounted for 4,691,000 tons, an advance of 839,000, or 22 per cent, on 1959, but a decrease of 441,000, or 8 per cent, from 1953. The railways worked 48 million more ton miles. That was an increase of 15 per cent, while receipts were up 12 per cent.

The railways forwarded 12,801,000 tons of coal and coke, 736,000 tons, or 6 per cent more than in 1959. Compared with 1953, the quantity was down 710,000 tons, or 5 per cent, and 120 million fewer ton miles were recorded. Evidently the average length of haul was shorter this year than last, as 18 million fewer ton miles were worked and receipts were only £26,000 higher.

The January Regional statistics showed an uplift in railway activity on the eastern side of England and in Scotland. The North Eastern had a traffic increase of 596,000 tons (14.6 per cent) and the Eastern carried 582,000 more tons (17.7 per cent). Scottish forwardings went up 291,000 tons (14.3 per cent). Comparative figures for the Western Region were a rise of 254,000 tons (8 per cent) and for the London Midland the forwarding of 300,000 more tons (5 per cent); these moderate increases led to operating difficulties in the Midlands which hampered the exchange of traffic with the East Coast lines. The Eastern Region coped with an increase of 346,000 tons, or 17 per cent, in coal and coke, while the London Midland was losing 37,000 tons, or 1 per cent, of its 1959 carryings, but kept its traffic fluid and the North Eastern Region has plenty of mobility left.

Too much importance should not be attached to the

January results as more of them may be fortuitous. Already the February statement of traffic receipts shows a decrease in freight train revenue of £562,000, or 2.5 per cent. Minerals were the only traffic to earn more. A decrease of £716,000 in coal receipts was significant of trouble to come. Coal furnishes about 62 per cent of total railway traffic. In the first 10 weeks of this year 2,591,000 fewer tons, or nearly 6 per cent, were won and a sharp fall in the quantity declared for rail carriage seems inevitable.

Last year British Railways' coal and coke revenue was down £13 million; that loss of over 10 per cent was bad enough, but this year's loss threatens to be more serious. There is no room for optimism about future prospects for our railways as freight carriers.

LETTERS TO THE EDITOR

(*The Editor is not responsible for opinions of correspondents*)

The Snape Branch

March 13

SIR,—May I correct an error on page 262 of your issue of February 26? Referring to the closure of the Snape branch of the Great Eastern Line of British Railways, Eastern Region, to goods traffic, on March 7, you stated that "passenger services were withdrawn from the Snape branch . . . some time ago."

In fact, although the branch was opened to goods traffic as long ago as June 1, 1859, no regular passenger trains ever ran over it, and the goods service of one train (or, at one period, two trains) a day, were the only regular workings. Indeed, I think that the only passenger trains ever to work to Snape were railway enthusiasts' specials.

The former Great Eastern Railway apparently intended in early days to build a station on the East Suffolk main line at Snape Junction, for until about 1867 Snape Junction appears in the East Suffolk line passenger timetable, although no train was ever shown to call there.

Yours faithfully,

B. D. J. WALSH

The Railway Club, 320, High Holborn, W.C.1

The Victoria Line, L.T.E.

March 22

SIR,—Mr. John Rodgers suggests in his letter on March 18 that the stations on the Victoria Line should be planned with separate entrance and exit platforms so that passengers could simultaneously enter a train on one side and leave it on the other.

Such a plan has several disadvantages. It would greatly increase the cost of the line; it would complicate the layout of stations and make passenger movement more difficult; and furthermore, it would make it impossible to provide cross-platform interchange. Experience at Hammersmith, Mile End, and Finchley Road has shown this layout to be a most desirable time and trouble-saving feature on an underground line, and accordingly nearly all the principal intermediate stations on the Victoria Line—Oxford Circus, Euston, Highbury and Finsbury Park—have been designed to provide cross-platform interchange.

Yours faithfully,

R. M. ROBBINS
Chief Public Relations Officer

London Transport Executive, 55, Broadway, S.W.1

March 12

SIR,—It is gratifying to learn what care the designers of the Victoria Line of London Transport have taken to provide for as easy an interchange as possible with other tube lines. But it is puzzling to read of the extremely complicated, and therefore costly, arrangements it is proposed to make at Euston.

Cross-platform interchange with the Northern Line at Warren Street would be more convenient to passengers, because Warren Street is on the West-End branch of the Northern Line, from which there are at all times of the day through trains to all stations on the Edgware and Barnet lines; from the City branch there are, outside peak hours on weekdays, only trains to the Edgware Line as far as Golders Green. Cross-platform interchange at Warren Street would also help travellers from Kings Cross and Victoria Line stations beyond to Leicester Square, Charing Cross, and Waterloo and *vice-versa*, and more particularly main-line passengers crossing London from St. Pancras or Kings Cross to Charing Cross or Waterloo. From the constructional point of view no re-alignment of Northern Line tracks would be necessary at Warren Street, as their platforms face outwards instead of forming an island, and the interverting of the Victoria Line tunnels between Oxford Circus and Warren Street could be dispensed with.

The only facility provided by the published arrangements for interchange at Euston which a Warren Street interchange would not provide, is cross-platform interchange for passengers from Finsbury Park and beyond to Northern Line stations in the City. But surely City-bound passengers from Walthamstow, Tottenham, and Seven Sisters, will, in any case, use the direct Eastern Region trains to Liverpool Street, or change to Moorgate-bound Eastern Region trains at Highbury.

Yours faithfully,

29, Oakwood Road, F. E. LAMOND
Bricket Wood, St. Albans

Changeable Year for American Railroads

March 8

SIR,—The article in your February 26 issue can be rounded off by quoting railroad revenues and expenses for the month of December and for 1959. The last month of the year was fairly clear of labour disputes, but railway freight revenue was only $11.3 million, or 1.7 per cent higher than in 1958, while passenger revenue declined by $6.4 million, or 9.6 per cent. For the whole year freight revenue was up $242 million (3 per cent) and passenger revenue down $24 million (3.6 per cent). Mail and parcels produced $26.5 million more receipts, so that total takings from passenger train services may not have decreased. Aggregate operating revenues rose by $261 million (2.7 per cent) on 1958 to $9,826 million; as the average revenue for the seven years 1951 to 1957 was $10,308 million, the last two years were a regrettably lean time for the railroads.

The railroads must have striven hard to hold the 1959 operating ratio down to 78.4 per cent, slightly below the 1958 ratio despite a rise of $161 million (2.1 per cent) in operating expenses to a total of $7,704 million. The economy drive left a net operating revenue of $2,122 million, $100 million (5 per cent) above 1958. Unfortunately, their crushing burden of taxation amounted to $1,047 million, an increase of $90 million (9 per cent). Debits for equipment and joint facility rents were also larger, so that net railway operating income (earnings before charges) dropped by nearly $13 million to $749 million, the lowest level since 1949. The rate of return on property investment dwindled to 2.72 per cent, the lowest rate in the last 20 years.

Last year's results justify the A.A.R. appeals to the Government for relief from the Federal excise tax on passenger fares; from exorbitant state and local taxes and from the subsidised competition of road, air and water carriers.

Yours faithfully,

YOUR CORRESPONDENT

Westminster, S.W.1

RAILWAY BENEVOLENT INSTITUTION.—At a meeting on March 21 the Board of the Railway Benevolent Institution granted annuities to six widows and three members involving an additional liability of £206 16s. per annum. One hundred and thirteen gratuities were also granted amounting to £1,095 10s. to meet cases of immediate necessity. Grants made from the Casualty Fund during the month of February amounted to £1,273 16s.

THE SCRAP HEAP

For Better Time-keeping

A correspondent has sent us the following, which, he states, he found among the classified advertisements in a well-known trade journal :—

" The British Transport Commission, in the course of its re-equipment programme, has decided to replace approximately 10,000 of the sand-operated egg-timers at its rural stations with second-hand wall clocks. The Commission therefore invites tenders for the purchase of the former and the sale of the latter, in lots of not less than six. Tenders should be addressed to the Chairman of the British Transport Commission, 222, Marylebone Road, London, N.W.1, not later than January 1, 1980."

British Railways Invalid Saloon

A correspondent points out that the saloon illustrated in our February 26 issue was built by the Metropolitan Amalgamated Railway Carriage & Wagon Company in February, 1905, for the South Eastern & Chatham Railway and not for the London & South Western, as was stated in error. It was numbered 3785 by the S.E.C.R. and used as a spare vehicle for that company's royal train and for certain other purposes before its conversion as an invalid saloon in 1939. It was No. 7919 in the Southern Region stock, the number which it still bears. The vehicle has now been withdrawn from service because of lack of patronage and is at Gatwick awaiting disposal.

Early Royal Saloons

The saloon shown in the illustration, *en route* to the British Transport Commission depot at Clapham, where it is being preserved with other historic vehicles, was built by the London & Birmingham Railway in 1843 for Queen Adelaide. The Great Western Railway constructed a royal saloon in 1840, in expectation of royal journeys. This vehicle seems to have been used only by Queen Adelaide and Prince Albert, as he then was, as there are contemporary references to construction of a new, eight-wheel vehicle, apparently finished in time for Queen Victoria's first trip by rail in 1842.

Satisfied Customer

Mr. Thomas Tappenden, a retired businessman who travelled daily for 27 years to London from his home at St. Albans, Hertfordshire, has sent British Railways a cheque "as a mark of gratitude for safe travel and courteous dealing." The cheque has been passed to the St. Christopher Railway Staff Orphanage.—*From the " Daily Mail."*

Dismantling the C.V.R.

The affectionate obituary of the Clogher Valley Railway, *The C.V.R. : In Memoriam*, by Evelyn Barrett, was read by several of us here with almost sentimental interest; for we were, I must confess, responsible for the demise, in 1942-43, of the C.V.R. Its effects were dismantled and made available, in one form or another, to the national war effort. The 35 miles of track yielded some 80,000 sleepers, most of which were handed over to the Royal Engineers in Northern Ireland. The dogspikes and other accessories went as scrap to a Scottish steelworks. The majority of its 3,000 tons of 60-lb. flat-bottom rails were in excellent condition—even on market days the traffic hardly assumed rush-hour proportions—and were re-used elsewhere. Its cattle trucks were acquired by another narrow-gauge railway in, I fancy, Donegal. Its venerable " green engines with black funnels " had, alas, to be broken up for their steel, cast iron, copper, brass, bronze, and so on. About the C.V.R. there was something endearing — although the C.V.R. was locally denigrated as " The Tram." As a name, Maguiresbridge may lack the euphony of Innisfree, but what man with an atom of poetic sensibility could fail to regret the disappearance of a little railway that chuffed down the main street of Fivemiletown, to serve Clogher, Augher, Ballygawley, Aughnacloy, Caledon, and Tynan in Co. Armagh ? Was there ever a richer procession of Irish names ?—*Mr. Felix L. Levy, Joint Managing Director, George Cohen, Sons & Co. Ltd. in " Country Life."*

Indian Passenger Traffic Difficulties

Between January and August, 1959, no fewer than 5,504,657 passengers on the Indian railways were detected travelling without tickets or with tickets not valid. Between January and October of that year the train alarm chains were pulled 45,220 times, of which 38,073 cases were considered to be unjustified. To counter this the communication chain was blanked off in 838 trains during November.

Day Ticket, No Strings Attached

Geoffrey Moss, who lives at Eye, Suffolk, was stopped as he got off a train at Norwich. As usual he had been holding his guitar between his knees in the compartment. An inspector told him: " A guitar is not ' personal hand-luggage ' on an outward journey by cheap day ticket—though it may be on the return journey." . . . The guitar was found to weigh 12 lb. Geoffrey was ordered to pay an excess luggage charge of 2s. 7d. . . . A railway official said: " We were within the regulations but we will turn a blind eye to the guitar in future. A day return passenger may take only personal hand-luggage on the outward journey. On the return, a passenger may carry more baggage—up to 60 lb. in weight—to cover possible purchases."—*From the " Daily Express."*

The Last o' the Line (No. 92220)

Among the few women who feel an affection for the steam locomotive one, the sister of a member of the staff of the North British Locomotive Co. Ltd., has written the verses reproduced below. They were read by Sir Cecil Weir, Member of the British Transport Commission, at the naming at Swindon, on March 18, of the last steam locomotive built by British Railways, referred to elsewhere in this issue.

There's mony a heart is wae this day ,
There's mony a heart is wae ;
For the last o' the line gangs forth this day
Fu' decked in bricht array.

There's a tear in mony an e'e this day,
There's a tear in mony an e'e,
As this braw giant o' steel an' steam
Gaes doon in history.

Wha kens the tracks that lie aheid ?
Wha kens whaur they maun lead ?
For the thochts o' men maun ne'er lie still
But aye maun forge aheid.

But thochts are bitter upon this day ;
For the men wha lo'ed an' made
This engine prood an' great, maun say
Fareweel, auld frien', for aye.

E.R.F.

Photo] *[A. Earle Edwards*

Queen Adelaide's saloon (1843), *London & Birmingham Railway*

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

New Gauge in S.W. Africa

The broadening of the 2-ft. gauge railway track to 3 ft. 6 in. between Kromberg and Tsumeb in South West Africa has been completed to a point north of Otjiwarongo. The first train on the new gauge was loaded at Otjiwarongo on February 6, and consisted of 70 vehicles hauled by two of the new diesel locomotives.

ANGOLA

Further Rail Link with Rhodesia

The 3-ft. 6-in. gauge line of the Mossamedes Railway running east from the port of Mossamedes, terminates at Vila Serpa Pinto, some 300 miles from the coast. Rhodesia Railways has made an aerial and ground reconnaissance of a line about 200 miles long from a point nine miles north of Livingstone to the Kwando River, on or near the frontier between Rhodesia and Angola. The Mossamedes Railway is considering building a line, about 700 miles long, between the Kwando and Vila Serpa Pinto. A through route between Mossamedes and Rhodesia would be roughly parallel to the Benguela Railway, to the north.

INDIA

Delhi-Rewari Doubling

The Northern Railway metre-gauge main line runs from Delhi southwestwards to Rewari, 52 miles distant. Rewari is an important junction upon which traffic converges from six directions by five lines. The Rewari-Delhi section is therefore a bottleneck and the first 23 miles at the Delhi end have recently been doubled. Work is also in hand on the doubling of the seven miles at the Rewari end and should be completed by about May. The estimated cost of the doubling of both these sections, totalling some 30 miles, is stated to be approximately £700,000.

NEW SOUTH WALES

Installation of Electronic Computers

A three-year programme to install electronic computing and punchcard machinery, designed to greatly increase internal efficiency, has been announced by Mr. N. McCusker, Commissioner for Railways. The equipment will be used at first for the streamlining of stock control methods within the Department's Stores Branch and later for the computing and printing of payroll details for the Government Railways 50,000 employees. Other costing activities are envisaged for the equipment as part of long range plans.

A contract for the leasing of the equipment has been signed with International Business Machines (Australia) Pty. Ltd. and the first installations will be made later this year. Other groups of machines will commence operating during the following two years.

Each group will contain an electronic calculator, calculator punch and high-speed accounting machines. Work has already commenced on the switchover from a manual to a machine system of stock control and a coded inventory covering 120,000 items is being prepared.

NEW ZEALAND

Reduction in Accident Rate

Accident prevention, which is now regarded as part of the job among the New Zealand Railways Department staff, has shown striking results in recent years. The approximate 25,000 staff are exposed to injury from 55 to 60 million hr. a year. A vigorous safety campaign has brought a drop in fatal accidents, reduced the severity of the accidents, and cut the rate of all classes of injury considerably. All accidents dropped by more than 50 per cent last year, compared with the figure for 1953, and were 13,903 then as against 5,936 in 1959. Eye accidents fell by about 75 per cent, from 4,024 in 1953, to 1,258 for last year. Fatal accidents totalled 15 in 1953, last year there were four. In 1952, a comprehensive universal accident reporting and statistical data system was introduced to ensure that all accidents are reported and their causes promptly investigated and remedied. Safety committees were set up in all mechanical branch workshops. Two full-time safety officers have been employed since 1953.

CANADA

Diesel Traction in Newfoundland

The process of converting the Newfoundland services of the Canadian National Railways to diesel traction was recently advanced a stage further, when nine diesel-electric locomotives were delivered to the island province. These locomotives were specially designed by C.N.R. engineers for the narrow-gauge tracks of Newfoundland. They are all 1,200 h.p., and will increase the number of diesel units in service throughout 750 miles of island system to 53.

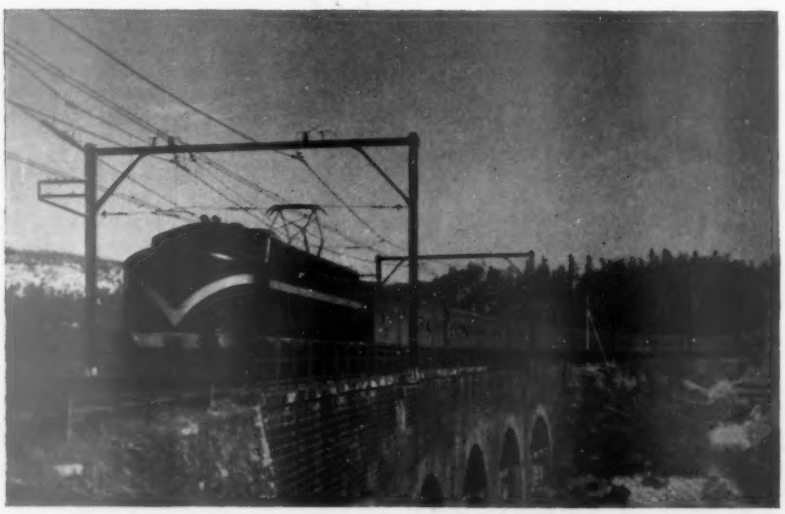
The locomotives were built by General Motors Corporation of London, Ontario, and shipped on heavy-duty flat wagons to Halifax where they were loaded aboard the Norwegian freighter *Christen Smith*, which had been chartered by the Canadian National Railways for the ocean voyage to St. Johns.

ARGENTINA

Staff Representation in Management

Representatives of the two railwaymen's unions have held several meetings with the Transport Secretary and the Minister of Public Works & Services, on the subject of workmen's representation in the management of the railways. The broad outline of the scheme is rapidly taking shape and at a date in the near future an interview with the President of the Republic will take place at which it will be definitely approved.

Electric Traction in India



English Electric Co. Ltd. 3,600-*h.p.* 1,500-*V. d.c. main-line electric locomotive on the electrified section of the Central Railway. English Electric is supplying electric equipments for the manufacture of a further* 10 *at Chittaranjan Works*

British Railways Chemical Research Laboratories

Chemical Services staff, London Area Chemical, Building Materials, and Corrosion Laboratories centralised at Muswell Hill, London

The new building housing British Railways chemical research laboratories in London, viewed from north and showing main entrance on right

REORGANISATION and expansion of the British Railways Research Department calls for concentration of effort from a reduced number of laboratories, these to be at centres which will serve all parts of the railway system. The first centre to be completed, a new building with a total floor area of about 17,000 sq. ft. erected on the site of the former Alexandra Palace Station at Muswell Hill, North London, accommodates the headquarters staff of the Chemical Services section of British Railways Research Department, the London Area Chemical Laboratory, the Building Materials Laboratory, and the Corrosion Laboratory. These were formerly at Euston, Stonebridge Park, Wimbledon, and Derby respectively. It also replaces the laboratories at Stratford of the former London & North Eastern Railway which were destroyed by bombing during the 1939–45 war. Reference to the formal opening of the new laboratories and offices by Sir Brian Robertson, Chairman of the British Transport Commission, was made in our last week's issue.

Economical Research Service

The reorganisation is being undertaken to give the most up to date and economical research service for the railways and for other undertakings of the B.T.C. Since 1951, the activities of about a dozen chemical laboratories which were inherited by the Commission from the former railway companies have been co-ordinated. Most of the laboratories were unsuitable for modern needs and it has become increasingly necessary to provide specialised and expensive instruments which are only economical if they are given the widest use centrally.

The London Area Chemical Laboratory serves a territory which extends to Sheerness, Aldershot, Reading, Oxford, Leamington, Rugby, Peterborough, and the Wash. It undertakes the routine testing of materials other than textiles; claims investigations into the causes of damage to goods in transit and accidents involving dangerous goods; laboratory investigations for the B.T.C. Police; the examination of water supplies, fuel, and foodstuffs; and the control of chemical manufacturing processes such as oil blending, train-lighting battery manufacture, and electroplating, and research problems arising in these fields.

The Corrosion and Building Materials Laboratories serve all parts of British Railways. In the former are investigated problems of metallic corrosion in structures and equipment exposed to exceptionally severe conditions, and advice is given on constructional methods and materials. The Building Materials Laboratory carries out investigations on new materials and in the rectification of defects in existing structures, for example, the reinforcement of decayed brickwork. Research is also carried out to find improvements which can be made in special acid- and corrosion-resisting cements and other materials.

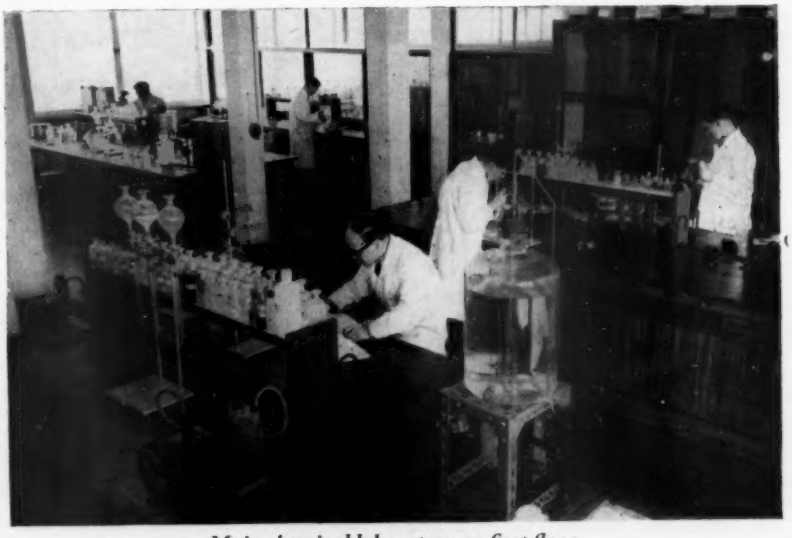
Three-storey Building

The new building, which has three-storeys including a semi-basement, is constructed of reinforced concrete faced with golden brown bricks, and there are panels of blue-grey ribbed slate set in artificial stone surrounds under the main laboratory windows on the first floor. The roof is flat for carrying out weathering tests of materials, and is equipped with penthouses containing lift motor equipment, storage tanks, and an office for recording data obtained from the weathering tests.

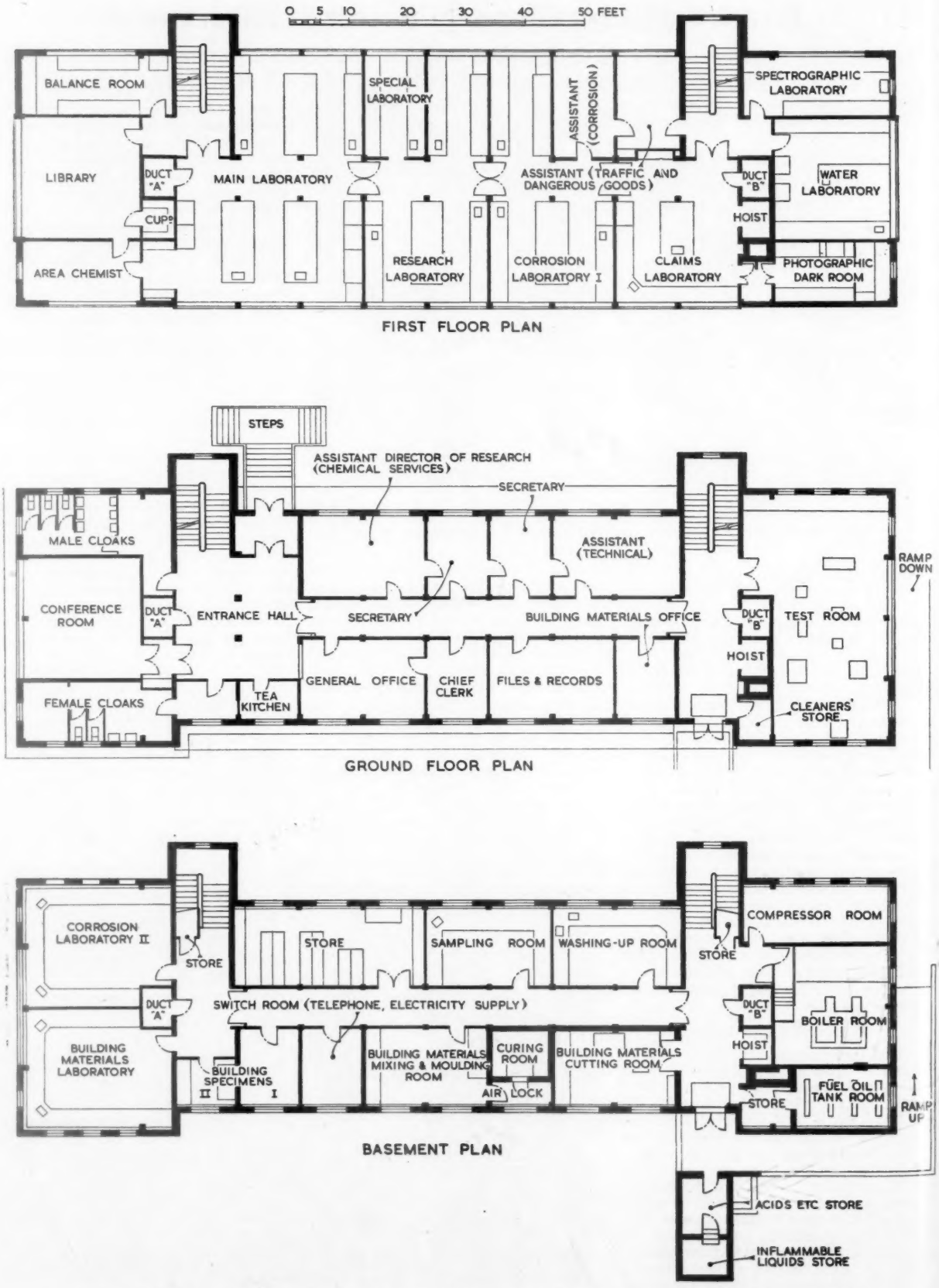
Most of the laboratory floors are covered with pvc Crestaline or acid-resisting tiles, and the walls are tiled where protection is required. Ceilings are sound-proof and, in the laboratories, flame resisting. The offices are similarly treated except that the floors have cork tiles. Venetian blinds are provided for windows of the main laboratories; artificial lighting is generally fluorescent.

Benches and fittings in the laboratories have been specially designed for the requirements of each department. Water, electricity, gas, compressed air, and vacuum services are distributed by two large vertical ducts extending from the bottom to the top of the building.

The ground floor is mostly occupied by administrative and other offices and



Main chemical laboratory on first floor



Plans of the three main floors of British Railways chemical laboratories building, Muswell Hill

it has a spacious entrance hall. There is a conference room to seat 22, and equipped for projection.

A test room, primarily for the examination of building materials and plastics, is also on the ground floor and equipment there includes an Avery 200-ton compression machine, a Swiss Amsler 50-ton compression machine, a Macklow-Smith bend-test machine, and a Hounsfield Tensometer.

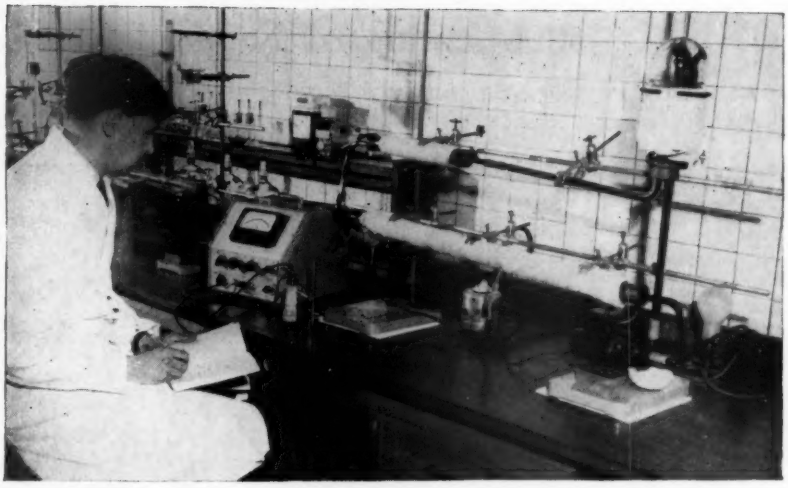
Laboratories on First Floor

The first floor contains most of the laboratories, which are linked by a series of double-swing doors. The avoidance of corridor partitions here provides the maximum of useful space and improves the distribution of natural light. Analytical control, which is the responsibility of the area chemist, is mostly undertaken in the main laboratory, sometimes with the assistance of the claims laboratory and the more specialised investigations of the research laboratory. Apparatus includes that which is needed for the examination of metals and for the assessment of lubricating oils. In a second part of the Area Chemical Laboratory a grating spectrophotometer is available for smoke analysis, the examination of synthetic materials, and so on.

Corrosion by Engine Coolant

An example of the work undertaken in the main corrosion laboratory is a study of the comparative efficiencies of different inhibitor combinations to prevent chemical action damaging the various metals and alloys used in the liquid-cooling systems of diesel engines.

The water laboratory is equipped for both chemical analysis and bacteriological investigations as are necessary for the examination of supplies for drinking purposes and so on. Another laboratory on the first floor houses a Hilger & Watts direct-reading medium spectrograph, type E549, for the analysis of oils. This can quantify 11 elements, automatically and in rapid succession, so making possible an accurate assessment of contamination by minute particles of individual metals held in suspension. A photographic dark room adjoining the claims laboratory, a balance room, and a technical library each provides a common service for the building.



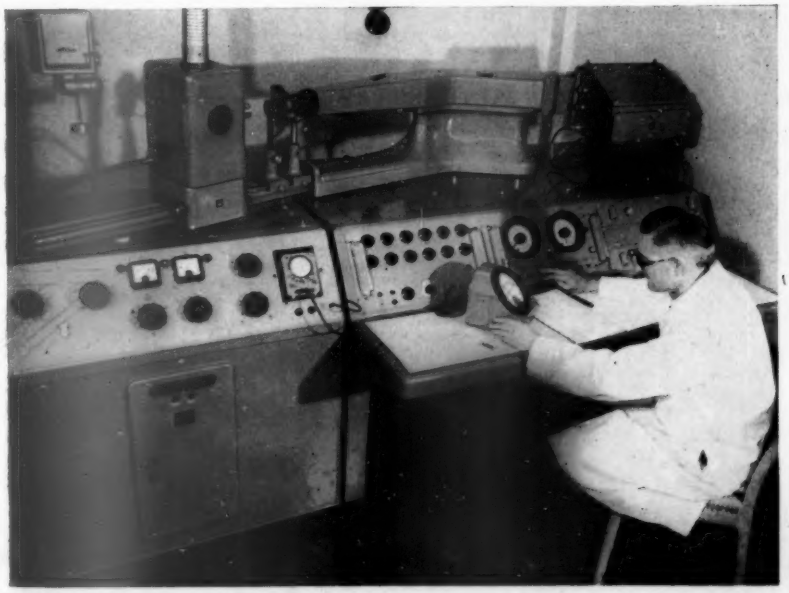
Apparatus for research into the effects of corrosion in the cooling systems of diesel engines

Semi-basement

The semi-basement is designed to provide additional services required by the laboratories on other floors. It contains a washing-up room for the cleaning of glassware and similar apparatus. Store rooms for the main stocks of acids and inflammable liquids are situated outside the building.

In the sampling room, materials of all kinds are ground and sieved, or otherwise reduced, for analysis. Massive materials are first broken down by a crushing machine in the cutting room, which is also equipped with a bench lathe and tools to facilitate the repair of instruments or the making of specially-designed apparatus. The boiler room has automatically-controlled oil-fired boilers providing hot water for the central-heating system and for bench services in the laboratories; compressed air for the benches is supplied from an automatically-controlled compressor and reservoir.

For telephone and electricity-supply equipment there is a special switch room which also contains the electronic circuits for a high-frequency radio communication system for locating members of the staff.



Spectrograph in which oil samples subjected to electric arc in rectangular compartment (top left) are analysed by direct readings

Water Curtain Humidifier

There are two laboratories in the semi-basement, one for carrying out corrosion investigations on a large scale, the other for studying building materials. Preliminary work for the building materials section takes place on this floor. In addition, there is a mixing room where concrete and mortars can be mixed and moulded under controlled conditions. From there an air-lock gives access to a curing room in which specimens are cured in air saturated with water vapour at a controlled temperature. The design of this room is unusual in that concontrol is effected by a curtain of water flowing down expanded-aluminium sheets on three of the walls.

The laboratories are well equipped with electric ovens and furnaces, and with instruments such as photo-electric absorption meters, a polarograph, and a flame photometer.

The architect for the building was Dr. F. F. C. Curtis, Architect to the B.T.C. The quantity surveyors were Messrs. Newberry & Wyatt, the consulting structural engineer was Mr. A. E. Beer, and the consulting services engineers were Messrs. F. C. Foreman & Partners. The general contractor was Holliday & Greenwood Limited.

Fabrication of Foam-plastic Seat Fillings

Cushion manufacture simplified by methods developed at Eastleigh Works, British Railways, Southern Region

Cushion-filling production department in trimming shop : work flows in clockwise direction from the right

CUSHIONS which remain resilient and correctly shaped over long periods of service under heavy use in suburban traffic will ensure not only greater passenger comfort but considerable savings in maintenance costs. Early in 1954, in attempting to benefit from advantages of this kind by improving on what was then current practice in British Railways, Southern Region, experimental work began at Eastleigh Carriage & Wagon Works to find a suitable resilient substitute for horse hair — the traditional cushion-filling material. The ultimate result has been the extensive use of foam plastic which has the required properties in respect of durability and additional advantages of cleanliness and flame-resistance; furthermore, by ingenious flow-production methods, the use of this material has made possible an increased output of seats at a reduced cost per unit.

Disadvantages of Horse Hair

Before foam plastic was adopted, the scarcity of horse hair was making replacement stocks increasingly expensive even for the shorter lengths and more brittle qualities still available. Most grades of hair tend to become bunched and, especially after being subjected to damp conditions, there is a loss of resilience. Careful carding and cleaning is necessary before it can be re-used for maintenance because of its tendency to collect dust quickly.

The successful results obtained with repeated mechanical compression tests to check the resilience of foam plastic relative to foam rubber and rubberised hair led to various trials in service. The first began in October, 1954, when three two-seater and one three-seater loose cushions filled with foam-plastic overlays to the unit spring inserts were installed in a Southern Region suburban coach. Although some of the foam plastic was of a coarse open-cell grade, the cushions gave completely satisfactory service under arduous conditions of use until January of this year, when the only deterioration was to the moquette covering. Similar cushions with horse-hair filling lost much of their shape.

Large-scale Use of Foam Plastic

The use of foam plastic was extended when, in 1957, it was incorporated in the cushions of 10 units of Southern Region

Chamfering a 1½-in. foam-plastic sheet clamped in jig

Seat-back fillings of deep-profile foam-plastic showing alternative assemblies, the latest on the left

suburban electric stock built at Eastleigh. In the same year 31 units, originally intended for the Victoria-Gatwick service, had seat backs in all first-class compartments filled entirely with foam-plastic sheet material prefabricated by cutting and the use of adhesives to give the correct profile with rectangular internal air cells.

The decision to use foam plastic for all second-class seating of some 236 coaches required for Stage I of the East Kent Electrification Scheme, necessitated a review of production costs. With the co-operation of the several manufacturers of foam plastic material it was found possible to obtain supplies of deep-profiled sheets 3½-in. thick, cut in facing pairs from 7 in.-thick rectangular blocks. Used singly these sheets were easily manipulated to form the seat-back contour and they eliminated the need for the prefabrication method used earlier to obtain the desired air-cell formation. A production line was established at Eastleigh for manufacturing foam-plastic cushion fillings as economically as possible. These are used in conjunction with standard unit spring inserts to form moquette-covered loose cushions held in aluminium seat trays in accordance with standard practice in the Southern Region.

Cushion Production Methods

For production work on seat fillings a staging has been erected in the trimming shop at Eastleigh with a floor area of about 600 sq. ft. This is equipped to enable the material to flow by a progressive system through five main operations on which seven men are engaged. All the fixtures were designed and manufactured by works staff; Dexion strip is used to support benches and so on.

First the 8-ft. 6-in. by 2-ft. 9-in. sheets of foam plastic, 1½-in. thick for overlays and 1-in. thick of a different colour for seat ends, are cut by hand-knife in adjustable jigs. Each 1½-in. sheet is sufficient for three two-seater cushions or two three-seaters. At this stage, ventilation holes are cut in the 1-in. material with a special hollow drill mounted in a Thor portable electric tool.

The second main operation chamfers the long edges of 1½-in. overlay material placed in a combined clamp and bevelling jig. A Scintilla Lesto G.E.2Q. foam cutter is used with 5-in. twin contra-reciprocating blades. Canvas tapes to enable the plastic fillings to be attached later to the spring interiors are then fixed to the chamfered edges with Dunloprene adhesive. The latter is applied by means of a large converted oil-can equipped with a fishtail spreader.

Further bands of adhesive are applied to the shorter edges and to pencilled fold lines on the 1½-in. overlays which are then placed in individual pre-forming jigs where each is folded into a channel section. A special roller tool is used to form permanent creases along the bands of adhesive.

Rotational Use of Jigs

The overlays remain in the jigs used for folding while they are passed to the final operation in the production of seat fillings—that of attaching the ends—for which purpose the bands of adhesive sometimes require a second and lighter application depending on the time delay.

One of the fixtures is a horizontal rack for feeding the used jigs back to the operator who forms the channel sections. The rack holds up to about a dozen jigs loaded on to it at one end complete with cushion fillings. These are drawn progressively towards the operator requiring the jigs by his use of a large vertical lever linked to a simple pawl mechanism engaging below the far-end jig. Thus the adhesive is allowed to set before the fillings are removed periodically from the near-end of the rack. This frees jigs for immediate re-use.

Aluminium Pallets

Light aluminium pallets provided with skids are each loaded with 25-30 cushion fillings which then pass down a gravity conveyor to the main floor of the shop. There each filling is assembled with spring insert, felt underlay, the moquette covering material, and a pvc cloth base to form the complete cushion. Hand sewing is used throughout the final assembly stage.

(*Continued on page* 370)

Forming cushion overlay in jig by use of special roller tool to crease material along band of adhesive

Civil Engineering for Main-line Electrification

Bridge rebuilding, station reconstruction, and track improvements as a prerequisite to the electrification of British Railways, London Midland Region, main line

Original bridge at Stockport Road, Manchester, left, and bridge after reconstruction, right

AS a result of the re-appraisal of the railway modernisation plan, announced last year, work on the electrification of British Railways, London Midland Region, main line at 25kV. 50 cycles a.c. is now taking place all along the London-Birmingham-Liverpool and Manchester line. The effect of this will be to bring forward the date for main line electric services to 1964-65, instead of 1968-70.

Electrification at 25kV. necessitates a considerable amount of civil engineering work. Many bridges have to be rebuilt, track reballasted, and stations remodelled.

Bridge Reconstruction

The bridgework required to be carried out ahead of electrification falls under the following headings:—

(*a*) Waterproofing underbridge superstructures for ballasted track.

(*b*) Increasing the height of wing walls of underbridges to suit ballasted track.

(*c*) Reconstruction of underbridges in steel and concrete, prestressed concrete, or reinforced concrete.

(*d*) The lifting or reconstruction of the superstructure of overbridges to give clearance for electrification.

So far 14 underbridge superstructures have been waterproofed, including Runcorn Viaduct which carries the main line over the River Mersey and is formed of three spans of 315 ft. each. The construction is of wrought iron main lattice girders, and the permanent way was originally carried on longitudinal timbers. It was necessary to repair and strengthen the cross girders and their connection to the main girders, waterproof the floor and substitute ballasted track for the longitudinal timbers. The cross girder connections have been strengthened with high-strength bolts and the cross girders strengthened with tensioned high tensile steel bars alongside the bottom flanges. It was not possible to have full occupation of the viaduct to carry out the waterproofing and ballasting, but by interlacing the tracks the work was done on each half of the viaduct consecutively, and completed in two weeks.

For the reconstruction of underbridges the steel and concrete superstructures are formed of welded steel main girders with rolled steel joist, or plated rolled steel joist cross girders encased in concrete. Spans of this type, up to about 40 ft. span, have been prefabricated alongside the site into bridge units, each supporting one track, and lifted into position in weekend occupations. Larger span bridges of similar construction supporting either one or two tracks were, wherever possible, erected alongside the existing bridge on trestles and rolled into position. Several bridges in this category have been completed in the Manchester area.

The four tracks crossing the bridge at Stockport Road, Manchester, were carried by two separate bridges, one consisting of a cast-iron arch centre span over the carriageway with two masonry arches spanning the footpath either side. The other was a double track wrought iron girder bridge which spanned between the abutments, the inner main girder being supported on intermediate cast-iron columns placed in line with and at the inner ends of the masonry piers of the other bridge. The outer main girder was unsupported between the abutments.

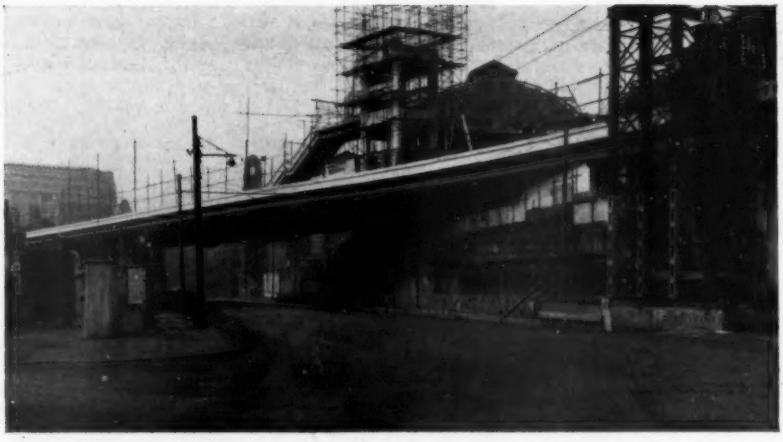
Demolition of tunnels and pier at Stockport Edgeley, left, and completed work viewed from Stockport Station, right

The two bridges were replaced by post-tensioned concrete box girders each independently carrying one track and spanning between abutments only, thus dispensing with both the original masonry piers and the cast-iron columns and improving road clearances.

Each box girder consists of 16 pre-cast box units weighing about 35 tons each, which are joined by cast in situ diaphragms and then post-tensioned with 16 Magnel-Blaton cables, each containing 72 wires 0.276 in. dia., giving a total tension force of 3,600 tons, the completed box girder weighing about 600 tons. The box girders, which are 7 ft. 6 in. deep excluding upstands, are 107 ft. span between inner bearings and 139 ft. span between outer bearings, the bearings being of steel and rubber.

The existing structures were replaced by temporary way beams supported on trestling during the site work on the concrete box girders, and were lifted out of each track in turn as the box girders were rolled into position.

At Hyde Road, Manchester, the original bridge was of wrought-iron girderwork and carried six tracks, and the superstructure was of three spans over the roadway. The intermediate supports were cast-iron columns at the pavement edges. The span of the bridge between abutments is 117 ft. 6 in. on the skew and 65 ft. on the square. The new superstructure is of two spans. The central support is three reinforced concrete portal frames placed end to end, each carrying the superstructure under two tracks. The superstructure is divided into three bridge units each carrying two tracks and each unit is formed of 44 pre-stressed transverse pre-cast concrete slabs, post-tensioned together longitudinally, the weight of slabs in each bridge unit being 590 tons. Each unit was built up complete on trestles alongside the existing bridge and rolled into position. The total weight rolled in any one operation was about 1,000 tons. The bearings of the bridge are of steel and rubber.



Fairfield Street Bridge, Manchester, during reconstruction, with London Road Station in the background

Originally, two separate wrought-iron girder bridges each carrying two tracks carried the railway over Fairfield Street. The new superstructure carries two tracks and the Manchester South Junction & Altrincham line platform over the road. The platform is over the cellular portion of the structure and the tracks are carried by the cantilevered portions on either side. The structure is of post-tensioned in-situ concrete, the skew span between abutments measuring 168 ft., the square span 60 ft. and the width 64 ft. The weight of the superstructure is 3,900 tons and each of the reinforced concrete inner column supports are designed to carry 2,500 tons and the outer columns designed to carry 1,000 tons. The total post-tensioning force was 12,000 tons.

The old bridge at Chancellor Lane was of three spans steel girderwork, the intermediate supports being steel columns on the pavement edges. The bridge supported six railway tracks. The new superstructure is formed of pre-tensioned pre-cast concrete longitudinal units laid side by side. Each unit is 130 ft. long and weighs 42 tons and is continuous over three spans. The intermediate supports are reinforced concrete portal frames, and take the place of the old columns. A special lattice steel lifting beam was designed to handle and erect the units.

The number of overbridges where the superstructure has been lifted so far is 57, and 62 bridges have had a complete reconstruction of the superstructure.

Manchester Oxford Road Station during reconstruction, showing conoid roof structure over main entrance

Station Reconstruction

To meet the needs of the new electrified services major station reconstructions are being carried out at London Road and Oxford Road, Manchester, and at Coventry. In addition a number of smaller stations are being modernised.

Manchester London Road will be renamed Piccadilly when it is opened as a terminus for the London-Manchester electrically hauled trains. The whole of the station frontage is now in the course of reconstruction and major permanent way remodelling is being carried out at the station approaches. The new station buildings in the course of construction are approached by a ramped roadway from London Road and are built on arches over the existing goods depot. The completed structure will comprise an eight-storey office block, 130 ft. high, with a two-storey amenity building accommodating the parcels office and railway staff rooms.

The existing steel barrel vaulted roofs over the platforms are being cut back and a new concourse with an 80 ft. roof span is now being constructed which will be unobstructed and act as a dispersal area to the various platforms. Passengers will enter the booking hall and will be able to book their tickets and proceed to the cafeteria, waiting room, enquiry office and shops, all situated in one enclosed and heated area. This new concourse will be free of parcels traffic and the movement of trucks and vehicles, as these vehicles will operate on a trucking way situated between the platforms and the barriers. The barriers themselves

will incorporate display cases and electrically operated train indicators.

The two difficulties encountered in remodelling Oxford Road Station were the tapering site and the made-up nature of the ground, prohibiting the employment of any heavy loading of a structure. Conoid shells were chosen in the design for the roof structure because of their ready adaptability for a tapering site and also allowing for uninterrupted floor space with good natural lighting.

Timber has been used in the roof structure for its lightness to reduce foundation loads and because its natural finish requires less maintenance than other conventional forms of structure. The concourse is thus roofed with three conoids ranging in width from 97 ft. 3 in. maximum to 41 ft. 6 in. minimum. The shells, which were constructed on site, are made up of three layers of boarding, nailed and glued, the laminated arches and ties being prefabricated as complete units. The shells are cantilevered forward of the arch line, partly to preserve structural balance and partly to accentuate the dramatic form of the roof. The inside of the shells is sprayed with a P.V.A. glaze and the exterior surfaces weatherproofed with patent glass-fibre reinforced roofing compound.

The five platform canopies are composed of cylindrical timber shells, cantilevering 12 ft. and spanning 34 ft. 9 in., supported on laminated frames. These shells were prefabricated in the joinery shops to achieve rapid site erection involving a minimum obstruction of the platforms. The upper edge of the shell forms a valance to the platform side. The canopy shells are also made up of three layers of glued and nailed boarding. The upper edge beam is covered with diagonal tongued and grooved boarding and the rear edge beam and gutter are formed in plywood, a series of small openings along the back of the shells being glazed with transparent plastic domes to provide natural lighting when a train is standing in the platform.

The timber used for the roof structure and for the free-standing booking office within the concourse is western hemlock.

Coventry Station Rebuilding

Under the modernisation plan, Coventry Station is being completely rebuilt to meet the new pattern of train services under electrification. Complete permanent way remodelling is being carried out and an island platform is being introduced to deal expeditiously with both stopping and through traffic. The new layout has necessitated the reconstruction of both Stoney Road and Warwick Road bridges. A new parcels depot with timber barrel roofing is also included in this scheme.

Planning of this new station provides for the segregation of passengers, parcels and G.P.O. traffic. The concourse will project at right angles to the covered platform, which splits the area in front of the station into two forecourts, the one on the left for parcels and mail, and the other for passengers arriving by car and taxi. The parcels forecourt is enclosed by the parcels office and staff accommodation and the passenger forecourt by public rooms and the car park.

Passengers arriving at the station by bus will be set down at a bus shelter at the end of the concourse and will have direct covered access to all parts of the building. The traffic circulation and the relationship of the station buildings to the new square projected by Coventry Corporation have been planned in consultation with the City Architect and Planning Officer. The concourse booking hall will contain the booking office, enquiry office, left luggage office, shops, telephone kiosks, and train indicators. Parcels traffic will be confined to a separate overbridge with lifts, parallel to the passenger bridge, both bridges forming an extension of the concourse.

Under the electrification scheme a considerable number of small stations required modernising. To cope with the large amount of work involved, a system of prefabricated reconstruction has been employed. On the Styal Line between Manchester and Wilmslow the stations have been reconstructed on these lines and in the first few of these reconstructions a proprietary modular steel frame was chosen for the structure, and research was concentrated on the development of suitable cladding panels, roof units, and other elements. The experience gained from this Mark I system was immediately applied to the Mark II, in which all elements are separately designed. The Mark II, which is planned on the module system, consists of four main dry constructed elements: an aluminium structural frame, roof units, external wall panels, and internal partition units. The structure consists of a pin jointed frame of cruciform section columns and rectangular beams. Both columns and beams are built up by fixing two extremely light extruded sections together to form the complete section.

Roof units are of two types, cantilevered and infill. The cantilevered type is of the same as that used on the Mark I system and consists of a series of triangular section stressed skin plywood box beams. The roof units on the top of the structural frame cantilevers from it to form an awning on the platform side. The infill roof unit rests within the depth of the aluminium beam and is a simple hollow stressed skin punt constructed in timber and plywood. Both types of roof can be used on the same building should this be necessary.

The external wall panels, which brace the aluminium frame are constructed as stressed skin units similar in principle to hollow flush doors, with internal timber members. The outer skin is of vitreous aluminium bonded to a plywood backing and the inner skin is of various types of building board to suit the requirements of the various rooms.

The internal partition units are similar in construction to the external wall units and are faced in various building boards. These units are not designed to brace the structure and are usually only one module wide.

A typical suburban prefabricated station

Construction of New Flyovers

To obviate delays to traffic by branch lines crossing the main lines, new flyovers are in the course of construction.

The flyover at Bletchley is in an advanced state of construction and will carry the Oxford and Cambridge traffic over the main line without interference. There are public roads at both the north and south ends of the flyover and the provision of access to the goods yard underneath the new line necessitated the construction of a two-track viaduct 1,360 ft. long. The spans vary in length from 85 ft. to 44 ft. Because of the main line electrification a minimum depth of construction of 17 ft. is required to allow for headroom. To meet this requirement and to cater for the skew crossing, the viaduct is carried over the track by a series of square spans supported alternately on portal frames and tee columns. The deck

consists of pre-cast pre-stressed concrete units 2 ft. 11 in. deep, the depth being constant for all spans and the amount of pre-stress varying for different lengths of span. The longer spans at the road crossing are of cantilever and suspended span construction. The cantilevers and anchor spans have been constructed in-situ and the suspended spans were pre-cast. The portal frames and the tee head columns are also pre-stressed but the normal trestle supports are constructed of reinforced concrete. The majority of the supports are carried on large diameter bored piles some 27 ft. long. The diverging tracks at the northern approach to the viaduct required the construction of cantilever approach walls 500 ft. long and the approach at the Oxford branch end tied reinforced concrete walls 28 ft. high and 490 ft. long. The Rugby Flyover is now in the tendering stage.

Bletchley Flyover under construction, showing various types of supporting columns to provide clearance for running lines

Opening of Tunnels

The original tunnel at Stockport was 288 yd. long and was constructed to take two tracks. When additional rail facilities were required a second tunnel was constructed alongside to take three additional tracks. Powers had been obtained to open out portions of the old tunnel so that, before the present reconstruction work, there were four separate lengths of tunnel, 123 yd., 33 yd., 53 yd., and 7 yd. long.

The original tunnel had sub-normal lateral clearances, whilst the three-track tunnel had inadequate vertical clearance for electrification. The pier between the two tunnels was 12 ft. 9 in. thick. Parliamentary powers were therefore obtained, after agreement with the local authorities, for the tunnels to be removed and replaced by a new two-span bridge 31 ft. wide carrying a roadway, a new two-span bridge 171 ft. wide carrying a roundabout, together with a public footbridge. Upon the demolition of the 12 ft. 9 in. thick pier between the tunnels it has been possible to provide normal lateral clearance for the tracks, while the new bridges provide adequate clearance for electrification as well as reducing the length of covered way from 261 yd. to 91 yd. Reinforced concrete columns constructed on the line of the old piers provide intermediate supports for the decks of the bridges, consisting of pre-cast pre-stressed concrete deck units. The tunnel abutments, which became retaining walls after the removal of the arch, were raised and strengthened as necessary.

Track Improvement Work

The electrification scheme incorporates major track improvement work which may be divided into (*a*) remodelling and (*b*) formation renewal, drainage, and reballasting. Remodelling of the permanent way at many of the large stations and at a considerable number of smaller ones is being carried out to deal with modern traffic demands with a minimum delay in operation. Remodelling of main line junctions will give increased speeds and in certain cases the transpositioning of lines will assist in the freer passage of traffic.

Where clay formation has broken down and is heaving upwards and slurrying the track ballast, formation renewal is being achieved by the mechanical excavation of the spent clay, blanketed by a layer of sand, with an adequate depth of ballast to carry the track. Drainage works are being carried out to replace obsolete or ineffective drainage systems and in many cases where no drainage previously existed. Throughout the routes to be electrified there is to be at least 9 in. of clean consolidated ballast underneath the sleepers.

These measures will result in better high speed running conditions; more uniform maintenance conditions which will permit permanent way operations being undertaken on a longer-termed programme basis rather than by the more frequent attention which is now necessary for trouble spots; freedom from trouble in extreme weather conditions; longer track life; and less wear and tear on vehicles.

The lines to be electrified embrace 1,434 single track miles, covering 507 route miles. This work has been segregated into the following: complete formation renewal (blanketing), 54 miles; completely new track drainage, 85 miles; renewal of existing track drainage system, 114 miles; screening of ballast and reballasting, 771 miles; and lifting of track to achieve depth of ballast, 305 miles.

The amount of ballast required for the above purposes will be 2,823,000 tons. Up to the end of 1959 the following mileage of work had been completed: complete formation renewal (blanketing), 20 miles; completely new track drainage, 22 miles; renewal of existing track drainage system, 32 miles; screening of ballast and reballasting, 307 miles; and lifting of track to achieve depth of ballast, 88 miles.

In undertaking a programme of this magnitude it was necessary in the first place to obtain the physical work con-

Typical sample of permanent way formation renewal, drainage works, and reballasting completed

tent throughout each section of the line. To obtain this information all tracks were levelled throughout, and side and overhead clearances of every structure were obtained or checked. Actual ballast and formation conditions were ascertained by digging trial trenches across the tracks every 10 ch. Where the trial trenches indicated a breaking down of the existing formation, special investigations were made to decide the remedial action required. Overhead electrification requires increased clearances above the present standard structure gauge and it has been necessary, from the longitudinal sections produced, to ascertain the final rail level. Because the undesirability of lowering track under bridges and thereby incurring drainage trouble, it has been necessary to raise many bridges and carry out other structural alterations to give the necessary clearances and at the same time maintain track improvement.

Another major incident of work has been the replacement of longitudinal timbers on bridges by sleepered and ballasted track, and also re-alignment and increased super elevation on curves to permit increased speeds.

Programming of Permanent Way Work

To achieve the target date for completion of the track improvement work it is obvious that speed restrictions and track possessions will be required far above the normal. Allowance has been made in the timing of trains for seven additional speed restrictions south of Crewe and one north of Crewe, which has had the general effect of increasing the booked times of trains over the routes affected.

The routes to be electrified have been sub-divided into 44 geographical sections and an assessment has been made of the time required to complete the work in each section based on 30 hr. double-line possession at weekends. As an example, the volume of work on the Rugby to Stafford line requires complete possession of all lines for 30 hr. each weekend to enable plant and ballast trains to operate and about 12 major jobs will be completed each weekend on this section of the line alone. Altogether, about 22 major jobs are undertaken each weekend on the electrification routes. Seven ballast cleaners are kept regularly employed, together with tamping machines and mechanical plant.

As a matter of normal policy, wherever practicable relaying of main lines is to be carried out with long welded rails used with concrete sleepers on an adequate depth of ballast. Apart from the anticipated saving in maintenance and longer life of the rail and sleepers, this track will give facilities for high speed with comfortable and comparatively noise-free running for the passenger. All the civil engineering work is being carried out under the general direction of Mr. A. N. Butland, Chief Civil Engineer, British Railways, London Midland Region.

The Fabrication of Foam-plastic Seat Fillings

(*Concluded from page* 365)

The rate of production of foam-plastic cushion fillings is sufficient for an output of between seven and eight coaches a week, each requiring 34 large and 10 small cushions. About 10,000 of these cushions are already in service and over 15,000 more are required.

Seat backs for some suburban vehicles will continue to be filled with hair but a programme has been drawn up for the production of 4,250 with foam plastic for vehicles needed for Phase II of the Kent Coast Electrification Scheme. These will have 1½-in. and 3½-in. deep-profile polyurethene-polyether which bears a closer resemblance to foam rubber in its recovery rate after compression than does the polyurethene-polyester used up to date; also it is stated to be cheaper and more soft. Both are non-inflammable and lighter in weight than foam rubber.

The arrangement of the latest filling is exposed in the left-hand seat back of the two show in the illustration. On the right is shown one of the earlier arrangements with deep-profile polyester covered at the top by similar material in ½-in. sheet. About 5,000 of these are in service.

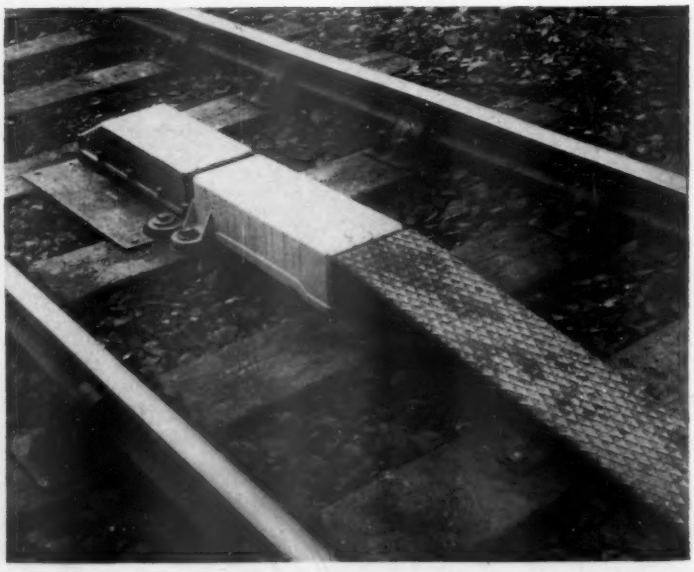
All off-cuts resulting from the production of foam-plastic seat cushion fillings are used for filling draft welts, trim pads, wings, and so on.

Much of the development work on the use of foam plastic at Eastleigh was carried out under the supervision of Messrs. F. J. Pepper, then Carriage & Wagon Engineer (Eastleigh), British Railways, Southern Region, and now Mechanical Engineer (General), British Transport Commission Headquarters; C. A. Shepherd, Assistant Carriage & Wagon Engineer; and L. I. Sanders, Works Manager (Carriage & Wagon), Eastleigh, Southern Region.

Automatic Warning System in Southern Region

(*See February 26 issue*)

British Railways A.W.S. gear installed in driving cab of "Battle of Britain" class locomotive



Typical A.W.S. track installation near Salisbury showing protecting ramp on approach side and permanent- and electro-magnet inductors

RAILWAY NEWS SECTION

PERSONAL

Mr. A. T. Gandell, General Manager, New Zealand Government Railways, has accepted an invitation by Mr. M. Moohan, Minister of Railways, to remain in office for another three years.

Mr. A. E. Flaxman, A.M.Inst. T., Commercial Officer, Western Region, British Railways, who, as recorded in our February 19 issue, has been appointed Chief Freight Officer, British Railways Central Staff, joined the Great Western Railway in 1917 in the office of the Chief Goods Manager at Paddington. In 1922 he transferred to the Engineer's Department and later to the office of the General Manager, returning to the Chief Goods Manager's Department in 1938. Mr. Flaxman became Chief Clerk at South Lambeth Goods Depot in 1942 and, the following year, was appointed Goods Agent at Oxford. He returned to London in 1944 as Cartage Superintendent, Paddington. He was appointed Assistant Goods Agent at Paddington in 1945, and Goods Agent at South Lambeth in 1946. He became Assistant District Goods Manager at Birmingham in 1947 and at Paddington in the following year. He was appointed Goods Agent, Paddington, in 1949, and District Goods Superintendent, Reading, in 1950. He later became Acting District Goods Superintendent, London, and District Commercial Superintendent, Worcester. He was then appointed Productivity Assistant to the Commercial Superintendent at Paddington. In March 1954, he was appointed Terminals & Cartage Assistant to the Chief Commercial Manager and in January, 1958, he became Commercial Officer. Mr. Flaxman holds the Brunel Medal of the London School of Economics.

Mr. A. E. Flaxman

Appointed Chief Freight Officer, B.R. Central Staff

We regret to record the death on March 16, at the age of 81, of Mr. T. L. Taylor who was for many years Chairman & Managing Director of Taylor Bros. & Co. Ltd., Trafford Park Steel Works, Manchester, a position from which he retired in December, 1946. On the formation of English Steel Corporation Limited he was one of the first Directors, being appointed in March, 1929, and retiring in 1946. Mr. Taylor was educated at Uppingham and Trinity College, Cambridge. On leaving Cambridge he joined the family concern of Taylor Bros. & Co. Ltd. He served on the Industrial board of Vickers Limited, and was for many years an active Director of the Metropolitan Carriage, Wagon & Finance Co. Ltd. (later Metropolitan-Cammell Carriage & Wagon Co. Ltd.) and in 1927 became Chairman, which position he held until October, 1934. He remained on the board until his retirement in September, 1950. Mr. Taylor was appointed a Director of G. Spencer Moulton & Co. Ltd., in 1931, and was Chairman from 1936 until his retirement from the Board in 1940. On the death of Lord Faber, in 1920, Mr. Taylor was appointed a Director of The Yorkshire Conservative Newspaper Co. Ltd., proprietors of *The Yorkshire Post* and *The Yorkshire Evening Post*, and when Mr. Rupert E. Beckett retired from the Chairmanship of the board in 1950, Mr. Taylor was appointed to succeed him. He was an outstanding sportsman and played cricket for Yorkshire. He was presented with a life membership of the Yorkshire County Cricket Club in 1926, and became President of the Club in 1947. The funeral service was held at St. Matthew's Church, Chapel Allerton, Leeds, on Monday, March 21, followed by a private cremation service.

The late Mr. T. L. Taylor

Formerly Chairman & Managing Director, Taylor Bros. & Co. Ltd.

Mr. G. Mackie, formerly Accounts & Budgets Assistant, Eastern Region, British Railways, has been appointed Assistant to the Accountant. He succeeds Mr. G. Phillips, who is retiring. Mr. F. S. Pyle, formerly Works Accountant, Stratford, becomes Rolling Stock Accountant, in succession to Mr. J. C. Sicely, who is retiring.

Mr. W. H. F. Mepsted, Chief Development Officer, Southern Region, British Railways, is retiring from this position on April 1.

We regret to record the death on March 16, at the age of 61, of Mr. H. Gilbert Ramsell, General Manager, Yale & Towne Manufacturing Company.

Mr. Cecil Garstang, Chief Assistant General Manager, Thos. Cook & Son Ltd., has been appointed to the boards of Thos. Cook & Son (Australasia) Pty., Thos. Cook & Son Inc., U.S., and Thos. Cook & Son (South Africa).

Mr. H. Randle

Assistant Chief Mechanical & Electrical Engineer, L.M. Region, who has retired

Mr. H. Randle, Assistant Chief Mechanical & Electrical Engineer, Derby, London Midland Region, British Railways, who, as recorded in our February 26 issue, has retired, began his railway career on the Great Western Railway as an apprentice in the Locomotive Works, Swindon. After experience in the Drawing Office, he was appointed Assistant to the Works Manager of the Carriage & Wagon Department in 1930. In 1937 he became Assistant Works Manager of the Locomotive Works, and in 1946 Manager of the Carriage & Wagon Works. In 1947 he became Manager of the Locomotive Works and was appointed Works Assistant to the Chief Mechanical Engineer in 1948. In January, 1950, he became Carriage & Wagon Engineer, Western Region, British Railways, and in August, 1951, Carriage & Wagon Engineer, London Midland Region, Derby. With the reorganisation of the department of the Chief Mechanical & Electrical Engineer in June, 1959, he was re-designated Assistant Chief Mechanical & Electrical Engineer, Derby. Mr. Randle served in both world wars.

We regret to record the death, on March 14 of Mr. George Wood, Vice-President, Thos. W. Ward Limited.

Mr. W. A. Bartlett has been appointed to the board of Microcell Limited as an Executive Director.

Mr. John P. Hunt has been appointed a Director of Wellington Tube Holdings Limited. Sir Walford H. Turner has resigned from the board for reasons of health.

Captain H. Leighton Davies, Assistant Managing Director, Steel Company of Wales Limited, has succeeded Lord Monckton as Chairman of the Industrial Welfare Society.

Mr. James Robertson is to be released from his executive position as Chief Production Engineer, Simms Motor Units Limited, to become Special Technical Assistant to the Managing Director.

Mr. D. Maxwell Buist, formerly Secretary, British Electrical & Allied Manufacturers' Association, who retired from executive duties last September is remaining in an advisory capacity until April.

Mr. H. Wilkinson

Appointed Assistant (Wages Staff), Regional Establishment & Staff Office, L.M. Region

Mr. H. Wilkinson, Assistant, Staff (Motive Power), Director of Traffic Services, London Midland Region, British Railways, who, as recorded in our March 11 issue, has been appointed Assistant (Wages Staff), Regional Establishment & Staff Office, was educated at New Mills Secondary School and Buxton College and began his railway career as a junior clerk at Bakewell in 1927. After experience as a relief clerk in the Derby, Manchester, Sheffield Area, in 1930, Mr. Wilkinson was transferred to Derby in the Office of the Divisional Superintendent of Operation, and in 1932 joined the Staff Section of the Office of the Superintendent of Organisation & Staff. In 1945, on the decentralisation of the Staff Organisation at Derby, he was transferred to the Watford Headquarters of the Chief Operating Manager. In 1953, Mr. Wilkinson was appointed Head of Section, Regional Establishment & Staff Office and Secretary of Sectional Councils Nos. 2 (Locomotive Staff), 3 (Traffic Staff), and 4 (Goods Staff). In 1957 he became Assistant, Staff (Motive Power), Director of Traffic Services, which position he leaves for his new appointment.

We regret to record the death on March 16, at the age of 55, of Mr. John Boddy, Chief Engineer & Technical Manager, Trico-Folberth Limited.

Mr. J. E. Smith, Managing Director, National Gas & Oil Engine Co. Ltd., has been elected to the board of Mirrlees, Bickerton & Day Limited.

Mr. Gordon R. Reeve, Sales Manager, Road Transport, Robert Kearsley and Company, has been appointed General Sales Manager. Mr. J. B. Blackham has been appointed London Office Manager.

Mr. Thomas P. Everett has joined the board of Hawker Siddeley Brush Turbines Limited as Sales Director. Previously Mr. Everett was Executive Director in charge of the Atomic Division of Richardsons Westgarth & Co. Ltd.

Mr. C. C. Birch has been appointed Assistant Managing Director of Guest, Keen & Nettlefolds (Midlands) Limited. Mr. Birch is on the board of L. H. Newton & Co. Ltd., a subsidiary of Guest, Keen & Nettlefolds Limited.

Mr. Allan Yeaman

Traffic Manager, Northern Division, Scottish Region, 1959-60

Mr. Allan Yeaman, O.B.E., J.P., Traffic Manager, Northern Division, Scottish Region, British Railways, who, as recorded in our March 4 issue, has retired, began his railway career with the former Caledonian Railway, which he joined in 1910 as a junior telegraph clerk at Perth. He subsequently served in various clerical positions at stations in Scotland and in the Office of the Chief Goods Manager, Glasgow. Mr. Yeaman held appointments at Derby and London before becoming District Goods & Passenger Manager, Inverness in 1940. In 1949 he was appointed District Traffic Superintendent and assumed his present position as Traffic Manager for the Northern Division of the Scottish Region in September, 1959.

Mr. E. J. Hudson has been appointed Divisional Manager, General Services Division, Plessey Co. Ltd.

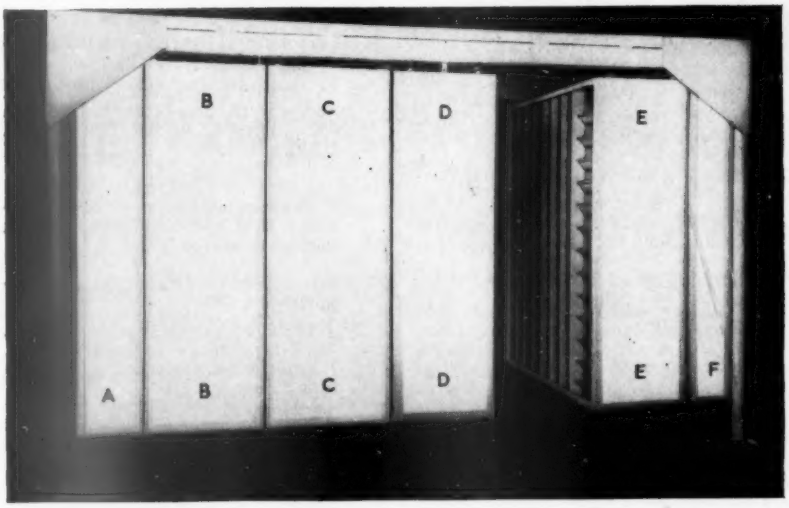
Mr. R. Leslie Hunter, a Director, Allied Ironfounders Limited, has been appointed a member of the Scottish Committee of the Council of Industrial Design.

Mr. T. Collier, General Manager of the Kilmarnock factory, Glacier Metal Co. Ltd., has been appointed a Director of the company.

Dr. C. J. Dadswell has relinquished the office of Managing Director of Davis & Lloyd (1955) Limited, and is appointed Chairman. Mr. C. Muirhead becomes Managing Director.

Mr. Sidney King, M.B.E., Assistant Manager, Thos. Cook & Son Ltd., has been appointed Negotiations Manager. Mr. King joined the company as a junior clerk in 1916, enrolled in the Royal Fusiliers in 1918, and returned to the company in 1920. He has served in over 20 Cook's offices in London and on the Continent. He was awarded the M.B.E. for his services as Controller of the Far East P.O.W. Department of the Red Cross during the 1939-45 war. He is Hon. Treasurer of the Institute of Travel Agents, Member of the Continental Railways Committee of the Association of Travel Agents and a prominent member of Skal, being Vice-Chairman of the National Committee of Skal Clubs of Great Britain and Past President of the London Skal Club.

NEW EQUIPMENT AND PROCESSES



Storage Systems

ILLUSTRATED on this page is Micro-store—a free-standing, self-contained, lockable storage installation comprising a four-pillar structure 7 ft. high x 3 ft. 10 in. wide, and carrying along its 10-ft. length a pair of heavily-reinforced Coburn tracks. Fitted to this are two single-sided and two, three, or four double-sided roller-suspended frames. Unlocked, these can be parted to produce a 3 ft. wide gangway giving access to their contents. Each frame is fitted with bins or sliding plastic trays moulded in a variety of shaped sub-divisions with rounded corners in all planes. Up to 10,000 separate stores location points can be provided. Frame units can also be supplied as free-standing units with a wheel base to serve as trolley or movable assembly sub-stores.

This system will be on exhibition at the manufacturer's new works at Paddington Green from May 2–6 inclusive—a news paragraph this week refers. Also on exhibition will be Ranplan, a steel cabinet for the storage of drawings in the flat. One-inch deep trays and cut-away sections allow easy location and quick reference of batches of drawings, and an envelope design prevents damage or loss down the back of the cabinet. All trays are fitted with press-formed radiused handles and ticket strip holders for identification. Three sizes provide 30, 60, and 90 trays covering popular sizes. Locking doors can be fitted.

Further details of these and other storage systems can be obtained from James H. Randall & Son Limited, Paddington Green Works, London, W.2.

Filtration Unit

THE "Renovair" is an entirely new type of filtration unit suitable for use wherever smoke concentrations and other atmospheric pollution occur. It is claimed to effect immediate reduction of tobacco smoke, savings on upkeep of upholstery and paintwork, economies in heating bills, improved visability, better health conditions, and to relieve listlessness and the discomfort of hayfever sufferers.

The unit comprises a 5-in. deep filter panel housed in a robust metal case with integral fan, electric motor, and built-in acoustic chamber for quiet operation. The filter panel has a paper element made of cellulose and asbestos fibres, folded into a deeply pleated form and cemented into a wooden case. The unit is suitable for wall or floor mounting, and requires single-phase 200-250 V. 5 A, electricity supply. It can be used continuously or as required. Under tests, it has cleared a 30-ft. x 20-ft. room of smoke and airborne contaminants down to ½-micron particles in a few minutes.

Further details can be obtained from Vokes Limited, Henley Park, Guildford, Surrey.

Portable Rail Cutter

THE "N.C.G.-Obear" portable abrasive rail-cutter cuts most rails in track in less than a minute, second-hand rail preparatory to welding, and can be used during re-laying and frog-and-turnout installation. Operated by one man, it possesses maximum protective shielding. A 26-in. cutting wheel is mounted on ball-bearings and powered by a 24-h.p. four-cycle engine. Water or oil lubricants are unnecessary. The wheel's life is lengthened by a mechanically-driven oscillator which moves it half an inch backward and forward off-centre.

Further details can be obtained from the National Cylinder Gas Division of the Chemtron Corporation, 840, North Michigan Avenue, Chicago 11, Illinois.

Millivoltmeter

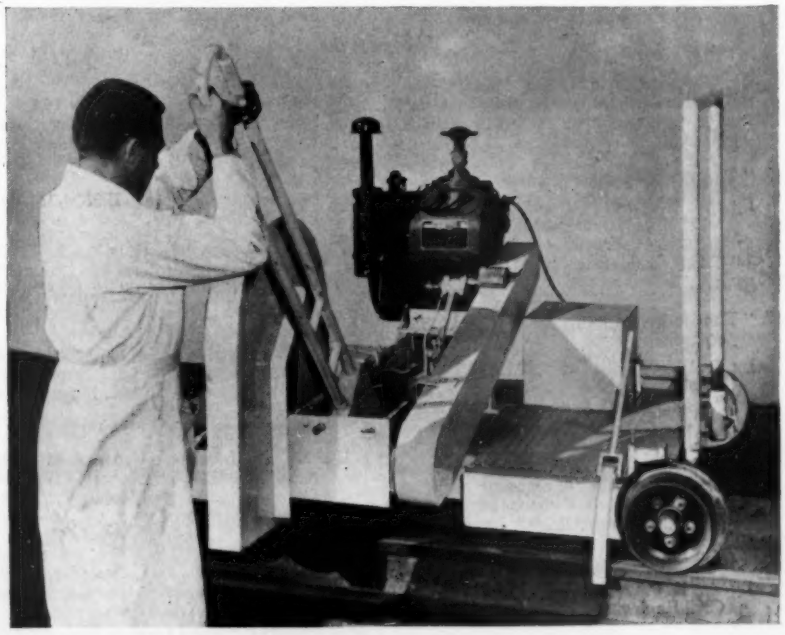
THE GM6020 is a very sensitive and stable d.c. millivoltmeter with 22 measuring ranges. There are 11 voltage ranges (100 uV-10V—full scale—with an input impedance of 1MOhm); 11 voltage ranges (10mV-1,000V.—full scale—with an input impedance of 100MOhm), and 22 current ranges (100uuA-10uA—full scale). Its accuracy is 5 per cent of full scale in the measuring range 0-100uV, and 3 per cent of full scale in all other measuring ranges. Of sturdy construction, it can also be used as a galvanometer.

Further information can be obtained from Research & Control Instruments Limited, Instrument House, King's Cross Road, London, W.C.1.

Lining Material

LIMPET board is a compressed material with a high asbestos content. It is incombustible and conforms to the requirements of B.S.S. 476/53 "Fire tests on building materials and structures" (Part I), Class I, and should be suitable for use in rail and road vehicle construction. It does not require special fixing and is easily worked by normal woodworking tools. It is tough, flexible, easily prepared for painting, and economical in price.

Further details can be obtained from the manufacturer, J. W. Roberts Limited, Chorley New Road, Horwich, Bolton.



British Railways Electrification Conference, 1960

Details of technical papers to be read before the conference, and of those papers to be printed and discussed but not read

Elsewhere in this issue we make editorial reference to the forthcoming electrification conference which will be held in London by the British Transport Commission from October 3–8 inclusive.

Listed below are details of the papers which will be read and/or made available.

1. " Electrification in the modernisation of British Railways: the choice of the 50-cycle system"

   By S. B. Warder, M.I.E.E., M.I.Mech.E., Chief Electrical Engineer, British Railways Central Staff, British Transport Commission

2. " The application of the 50-cycle system as proved by system tests"

   By J. A. Broughall, B.Sc.(Eng.), M.I.E.E., Electrical Engineer (Development), British Railways Central Staff, B.T.C.

   and

   F. J. Lane, O.B.E., M.Sc., M.I.E.E., Consulting Engineer, Messrs. Preece Cardew & Rider, 8-10-12, Queen Anne's Gate, Westminster, S.W.1

3. " The locomotives "

   By E. S. Cox, M.I.Mech.E., Assistant Chief Mechanical Engineer, British Railways Central Staff, B.T.C.

   and

   G. G. Kibblewhite, B.Sc.(Eng.), A.M.I.E.E., Assistant (Rolling-Stock Equipment), Chief Electrical Engineer's Department, B.R. Central Staff, B.T.C.

4. " The multiple-unit trains "

   By H. Willcock, B.Sc.(Eng.), A.M.I.Mech.E., Design Engineer (Standards), Chief Mechanical Engineer's Department, B.R. Central Staff, B.T.C.

   and

   C. J. Clemow, B.Sc.(Eng.), Senior Technical Assistant (M.U. Equipment), C.E.E. Dept., B.R. Central Staff, B.T.C.

5. " The power supply "

   By W. J. Webb, B.Sc.(Eng.), A.M.I.E.E., Assistant Electrical Engineer (Systems), C.E.E. Department, B.R. Central Staff, B.T.C.

6. " The overhead line equipment "

   By E. Claxton, B.Sc.(Eng.), M.I.C.E., M.I.E.E., A.M.I.Mech.E., Assistant Electrical Engineer (Development), C.E.E. Department, B.R. Central Staff, B.T.C.

7. " The erection of the overhead line equipment "

   By J. W. Grieve, B.Sc., M.I.E.E., Electrical Engineer (New Works), Eastern Region, British Railways

   and

   A. H. Emerson, A.M.I.E.E., Electrical Engineer, Chief Mechanical & Electrical Engineer's Department, London Midland Region, British Railways

8. " Civil engineering aspects "

   By A. K. Terris, B.Sc., M.I.C.E., Chief Civil Engineer, Eastern Region, B.R.

9. " The interference problem "

   By H. R. J. Klewe, Ph.D., M.I.E.E., Senior Technical Assistant, C.E.E. Department, B.R. Central Staff, B.T.C.

10. " Signalling & telecommunications "

    By A. W. Woodbridge, O.B.E., M.Sc., M.I.E.E., Chief Signal Engineer, B.R. Central Staff, B.T.C.

11. " Research for a.c. traction "

    By F. T. Barwell, Wh.Sch., Ph.D., B.Sc. (Eng.), M.I.Mech.E., A.M.I.E.E., Electric Traction Engineer (Research), B.R. Central Staff, B.T.C.

    Conclusion

    R. C. Bond, M.I.C.E., M.I.Mech.E., Technical Adviser, B.T.C.

12. " System tests: instrumentation and measurements "

    By W. J. Webb, B.Sc.(Eng.), A.M.I.E.E., Assistant Electrical Engineer (Systems), C.E.E. Department, B.T.C.

    and

    W. Woods Hill, Manager (Computor Division), Microcell Limited, Ingersoll House, Kingsway, London, W.C.2

13. " System tests: evaluation of results "

    By G. H. Hinds, O.B.E., B.Sc., Electronics Advisory Officer, B.T.C.

    and

    T. A. Eames, M.Sc., F.I.P., Superintendent, Mathematics & Physics Section, Engineering Division, B.R. Research Department

14. " The consulting engineer's contribution to 50-cycle electrification "

    By E. L. E. Wheatcroft, M.A., M.I.Mech.E., M.I.E.E., Partner, Messrs. Merz and McLellan, Consulting Engineers, Milburn, Esher, Surrey

15. " Locomotives: Nos. E. 3001/23 and E. 3301/2 (A.E.I., Rugby) "

    By M. W. T. Rees, B.Sc., A.M.I.E.E., Chief Engineer, Traction Department, Rugby, A.E.I. Limited (Traction Division)

16. " Locomotives: Nos. E.3024/35 and E. 3303/5 (E.E. Co.) "

    By W. G. Jowett, B.Sc.(Eng.), A.M.I.E.E., Chief Engineer (Traction), English Electric Co. Ltd., Phoenix Works, Bradford

    and

    S. C. Lyon, Chief Design Engineer, Rolling-Stock Design Department, English Electric Co. Ltd., Preston

17. " Locomotives: Nos. E.3036/45 (G.E.C.)"

    By W. D. Morton, M.A., A.M.I.E.E., A.M.I.Mech.E., Manager, Traction Division, General Electric Co. Ltd., Witton, Birmingham

    and

    H. W. Scott, Chief Designer, North British Locomotive Co. Ltd., Flemington Street, Glasgow

18. " Locomotives: Nos. E.3046/55 (A.E.I., Manchester) "

    By G. R. Higgs, B.Sc., M.I.E.E., Divisional Chief Engineer, A.E.I. Limited (Traction Division)

19. " Locomotives: Nos. E. 3056/95 (B.R./A.E.I., Rugby) "

    By G. G. Kibblewhite, B.Sc., A.M.I.E.E., Assistant (Rolling-Stock Equipment), C.E.E. Department, B.R. Central Staff, B.T.C.

    and

    F. Horne, Chief Locomotive Draughtsman, C.M. & E.E. Department, Eastern Region, B.R.

20. " Pantographs for locomotives and multiple-unit trains "

    By E. E. Chapman, B.Sc., M.I.Mech.E., M.I.E.E., Director & Chief Engineer, J. Stone & Co. (Deptford) Ltd., Deptford, London, S.E.14

21. " Effect of dynamic performance of rolling-stock on current collection "

    By J. L. Koffman, Design Engineer (Projects), C.M.E., B.R. Central Staff, B.T.C.

    and

    H. L. Preston, Senior Technical Assistant (Inspection), C.E.E. Department, B.R. Central Staff, B.T.C.

22. " Effect of electric rolling-stock on track "

    By J. C. Loach, M.Sc., M.I.Mech.E., A.M.I.C.E., Superintendent, Research Permanent Way Section, Engineering Division, B.R. Research Department

23. " Locomotives and multiple-unit trains under development "

    By J. A. Broughall, B.Sc., M.I.E.E., Electrical Engineer (Development), B.R. Central Staff, B.T.C.

    and

    E. S. Cox, M.I.Mech.E., Assistant Chief Mechanical Engineer, B.R. Central Staff, B.T.C.

24. " Multiple-unit train equipments for Manchester - Crewe line (A.E.I., Rugby) "

    By M. W. T. Rees, B.Sc., A.M.I.E.E., Chief Engineer, Traction Department, Rugby, A.E.I. Traction Division

    and

    R. Bugler, M. A., A.M.I.E.E., Engineer, Traction Department, Rugby, A.E.I. Limited (Traction Division)

25. " Multiple-unit train equipments for London - Tilbury - Southend line (E.E. Co.) "

    By H. B. Calverley, B.Sc.(Eng.), A.M.I.E.E., Assistant Chief Engineer (Developments), Traction Department, English Electric Co. Ltd., Phoenix Works, Bradford

    and

    E. Williams, B.Sc.(Eng.), A.M.I.E.E., Control Gear Designer, Traction Control Design, English Electric Co. Ltd., Phoenix Works, Bradford

26. " Multiple-unit train equipments for Liverpool Street – Enfield – Chingford–Hertford – Bishops Stortford Lines (G.E.C.) "

    By R. Ledger, B.Sc.(Tech.), A.M.I.E.E.,

Chief Traction Machine Engineer, General Electric Co., Ltd., Traction Division, Witton, Birmingham

and

J. C. Turrell, A.M.I.E.E., Chief Traction Control Engineer, General Electric Co. Ltd., Traction Division, Witton, Birmingham

27. "Multiple-unit train equipments for Glasgow suburban lines (A.E.I., Manchester)"

By G. R. Higgs, B.Sc., M.I.E.E., Divisional Chief Engineer, A.E.I. Limited (Traction Division),

and

J. G. Sommerschield, M.Sc., A.M.I.E.E., Engineer, Traction Projects Department, A.E.I Limited (Traction Division)

28. "Power supply: the railway load"

By W. Casson, M.I.E.E., Transmission Design Engineer, Central Electricity Generating Board, Bankside House, Summer Street, London, S.E.1

and

W. L. Kidd, B.Sc., M.I.E.E., A.M.I.C.E., System Design Engineer, South of Scotland Electricity Board, Glasgow

29. "Power supply: oil-insulated switchgear"

By F. G. Rowland, M.I.E.E., Director & General Manager, Switchgear & Cowans Limited, Old Trafford, Manchester

30. "Power supply: air-insulated switchgear"

By A. T. Haselfoot, M.A., M.I.E.E., Director & Chief Engineer, Fuller Electric Limited, Fulbourne Road, Walthamstow, E.17

and

G. T. D. Ingle, M.A.(Cantab), Manager (Power Department), Fuller Electric Limited, Fulbourne Road, Walthamstow, E.17

31. "Power supply: protection systems"

By F. M. Pearce, B.Sc.(Eng.), A.M.I.E.E., Engineer, Instruments & Meter Department, Instrumentation Division, A.E.I. Limited, Trafford Park, Manchester

and

G. T. D. Ingle, M.A.(Cantab), Manager (Power Department), Fuller Electric Limited, Fulbourne Road, Walthamstow, E.17

32. "Power supply: remote control of power distribution"

By A. H. Cole, A.M.I.Mech.E., Senior Technical Assistant, C.E.E. Department, B.R. Central Staff, B.T.C., G. A. Burns, Chief Engineer (Power Signalling Division), Automatic Telephone & Electric Co. Ltd., Lord Nelson Street, Liverpool 3,

and

G. Gordon White, B.Sc., Sales Engineer, Instrumentation & Control Division, Standard Telephones & Cables Limited, Enfield, Middlesex

33. "Overhead equipment: the catenary system"

By C. E. Allen, A.M.I.C.E., Chief Traction Engineer, British Insulated Callenders Cables Limited, Kirkby, nr. Liverpool

and

A. Goldring, B.Sc.(Tech.), A.M.I.E.E., Senior Technical Assistant, C.E.E. Department, B.R. Central Staff, B.T.C.

34. "Overhead equipment: insulators"

By C. H. W. Clark, Ph.D.(Eng.), A.M.I.E.E., Chief High Voltage Engineer, Steatite & Porcelain Products Limited, Bewdley Road, Stourport-on-Severn, Worcestershire

35. "Overhead equipment: structures and foundations"

By H. H. Storey, Assistant Manager (Design), Traction Contracts, British Insulated Callenders' Cables Limited, Kirkby, nr. Liverpool

and

A. N. Other, British Railways

36. "Overhead equipment: erection"

By T. H. Rosbotham, B.Sc., District Engineer, British Insulated Callenders' Cables Limited, Shenfield, Essex

and

I. J. Hall, B.Eng., Resident & Construction Engineer, Pirelli General Cable Works Limited, Glasgow

37. "Effect on post office circuits"

By D. W. R. Cobbe, A.M.I.E.E., Senior Executive Engineer (Construction Branch), Post Office Engineering Department, 2-12, Gresham Street, London, E.C.2

and

B. R. Horsfield, A.M.I.E.E., Senior Executive Engineer (Telephone Branch) 2-12, Gresham Street, London, E.C.2

38. "Signalling equipment (A.E.I.–G.R.S.)"

By G. I. Foster, B.Sc., Signal Engineer, Signals Department, A.E.I. Limited (Traction Division)

39. "Signalling Equipment (Siemens & General Electric Railway Signal Co. Ltd.)"

By H. J. N. Riddle, A.M.I.E.E., M.I.R.S.E., Design & Development Engineer, Siemens & General Electric Railway Signal Co. Ltd., East Lane, Wembley

40. "Signalling Equipment (Westinghouse Brake & Signal Co.)"

By D. G. Shipp, B.Sc., M.I.E.E., M.I.R.S.E., Assistant Divisional Manager, Signal Colliery Division, Westinghouse Brake & Signal Co. Ltd., 82, York Way, Kings Cross, London, N.1

41. "Railway Telecommunication Cables & Equipment"

By D. R. Turner, M.Eng., M.I.E.E., M.I.R.S.E., Assistant Telecommunications Engineer, Chief Signal Engineer's Department, B.R. Central Staff, B.T.C.

EXPANDED METAL CO. LTD. RESULTS.—The Group net profit for 1959 is £191,296 (£122,713) and dividend on capital has been increased by rights issue 20 per cent (16·8 per cent adjusted for scrip issue). Fixed assets are £552,344 (£566,936), net current assets £1,145,943 (£753,075) and net assets, after deducting future tax, £1,558,587 (£1,183,184).

Visit of Chilean State Railways Chief Signalling Engineer

Señor Luis Falcone, Chief Engineer (Signalling), Chilean State Railways, visited Britain on March 13-18 under the auspices of the United Kingdom Railway Advisory Service.

On March 13 he was welcomed by Mr. E. G. Brentnall, Signal Engineer, British Railways, London Midland Region, and later met Mr. A. W. Woodbridge, Chief Signal Engineer, British Transport Commission. Next day he inspected signal installations and other works in the Southern Region, and a dinner was held at which Messrs. Woodbridge, Brentnall, and Messrs. J. F. H. Tyler and R. A. Green, Signal Engineers respectively of the Southern and Eastern Regions, were present.

Visits to Railway Installations

Signalling installations, apparatus in Temple Mills marshalling yard, and other works in the Eastern Region were seen by Señor Falcone on March 15. Later he travelled to Manchester. He returned from Manchester to Crewe next day, visiting signal-boxes on the newly-electrified lines of the London Midland Region and the remote control installation at Wilmslow, and seeing electrification and other works, returning later to London.

March 17 was spent with the Westinghouse Brake & Signal Co. Ltd., viewing plant and equipment. In the evening he was entertained to dinner at the Charing Cross Hotel by the Chairman, Brigadier A. E. M. Walter, and other members of U.K.R.A.S.

Those present were:

Brigadier A. E. M. Walter, Ministry of Transport; Messrs. H. A. A. Hankey, Foreign Office; C. J. A. Whitehouse and A. D. Neale, Board of Trade; S. J. Bennett, Ministry of Transport; M. H. Lovell, Central Office of Information; A. W. Woodbridge; E. G. Brentnall;

Messrs. F. L. Castle, L. G. Culleton, J. C. Kubale, L. W. H. Lowther, and M. W. Shorter, Railway Signals Group of Manufacturers; G. R. Curry, F. A. Manley, and A. V. Stewart, Locomotive & Allied Manufacturers' Association; M. Gardiner-Hill and C. L. Trask, Railway Carriage & Wagon Building Association;

Messrs. M. C. Inglis, R. V. Kennard, W. A. P. Manser, D. Martin, and L. B. Walsh, British Iron & Steel Federation; D. H. Rooney and C. G. E. Parrott, B.E.A.M.A.; C. F. Hawkins, Peat, Marwick, Mitchell & Co. Ltd.; P. H. S. Drew, *The Railway Gazette*; and C. F. Klapper, *Modern Transport*.

Brigadier Walter, welcoming Señor Falcone, explained the scope of the Advisory Service and drew attention to the many ways in which railways in Britain and the industries which supplied them could help to answer the queries of railway officers overseas. Señor Falcone expressed his gratitude for all that had been done for him. After dinner two colour films were shown: "A Report on the Modernisation Plan," by the B.T.C. Film Unit, and the Spanish version of "British Locomotives" made by the C.I.O. in conjunction with the L.A.M.A.

After spending the day with the Siemens & General Electric Railway Signal Co. Ltd., Señor Falcone left on March 18 for Paris, *en route* to Chile.

BOLTON GATE CO. LTD. OPEN LONDON OFFICE.—Bolton Gate Co. Ltd., has opened an office at Abbey House, Victoria Street, London, S.W.1., telephone Abbey 6942. It will be in the charge of the Southern Area Manager, Mr. F. W. J. Fry, and will cover Greater London and the Southern and Eastern Counties.

Last Steam Locomotive Completed at Swindon Works

Naming of Class "9" 2-10-0 locomotive "Evening Star"

The last steam locomotive built by British Railways, a 2-10-0 Class "9," goods engine, No. 92220, was named *Evening Star* and a commemorative plaque was unveiled by Mr. K. W. C. Grand, Member of the British Transport Commission and formerly General Manager of British Railways, Western Region, at Swindon Works, Western Region, on March 18.

Mr. R. F. Hanks, Chairman of the Western Area Board, B.T.C., welcoming the guests, expressed his admiration for the steam locomotive. Among those present who were concerned with the design of steam locomotives he wished to mention specially were Sir William Stanier, Mr. O. V. S. Bulleid, Mr. H. G. Ivatt, and Mr. R. A. Riddles.

Sir Cecil Weir, Member of the B.T.C., in the course of a brief speech read verses composed to commemorate the passing of steam; these are reproduced on page 359.

Adaptation to Diesel Building

Mr. Grand referred to Swindon as having always been the cradle of locomotive history and praised the manner in which the works had turned, without interruption of output, from steam to the making of diesel locomotives.

After the unveiling ceremony Mr. Hanks presented awards to each of the three members of the Western Region staff who had been successful in a competition to suggest the most suitable locomotive name. They were Mr. F. L. Pugh, General Manager's Office, Paddington; Mr. T. M. Phillips, an engine driver of Aberystwyth; and Mr. J. S. Sathi, a boilerwasher at Old Oak Common Running & Maintenance Depot. All three chose the name *Evening Star* which was originally born by a former Great Western Railway locomotive, one of the first ordered by that company. The series of express locomotives which was started in 1906 became the "Star" class and formed the basis of all later four-cylinder express passenger steam locomotives on the Great Western Railway and now in the Western Region.

A special variation from the standard Class "9" design in No. 92220 is the use of Western green livery and the fitting of a copper top to the chimney.

Exhibition of Locomotives and Rolling Stock

Visitors were enabled to see the exhibition of locomotives and rolling stock, largely built in the works. These included two 2,200 h.p. diesel-hydraulic locomotives, Nos. 817, *Foxhound*, and 818, *Glory;* the trailer car of an "inter-city" multiple-unit diesel train; a three-car diesel "cross-country" train; a 200 h.p. diesel shunting locomotive; two 4–6–0 locomotives, *George IV* ("King" class) and *Earl of Waldegrave* ("Castle" class); a new corridor first class brake composite and a restaurant car; G.W.R. "City" class 4–4–0 locomotive *City of Truro;* Caledonia Railway 4–2–2 No. 123; and G.W.R. 2–2–2 locomotive *North Star* (permanently exhibited); also an assembly of one set of complete power equipment for a diesel-hydraulic locomotive.

Others attending the ceremony included:

British Transport Commission: Messrs. H. F. Barker, J. Ratter, and Sir Leonard Sinclair, Members;

Maj.-General Ll. Wansbrough-Jones, Secretary-General; Messrs. M. H. B. Gilmour, Chief Solicitor & Legal Adviser; T. H. Hollingsworth, Traffic Adviser; R. C. Bond, Technical Adviser; J. H. Brebner, Public Relations Adviser; G. W. Quick Smith, Adviser (Special Projects); S. B. Taylor, Chief Secretary; C. Barman, Chief Publicity Officer; E. W. Arkle, Chief Traffic Officer; J. F. Harrison, Chief Mechanical Engineer; S. B. Warder, Chief Electrical Engineer; A. W. Woodbridge, Chief Signal Engineer; R. B. Hoff, Chief Supplies Officer; C. C. Inglis, Chief of Research; T. M. Herbert, Director of Research (British Railways) and J. H. Scholes, Curator (Historical Relics);

Western Area Board, B.T.C.: Messrs. A. Chamberlain, F. A. Parish, Cecil W. Rodd, and Percy Morris, Members; Mr. A. H. Curtis Welch, Secretary;

Western Region: Messrs. R. A. Smeddle, Chief Mechanical & Electrical Engineer; H. G. Bowles, Assistant General Manager; A. C. B. Pickford, Assistant General Manager (Traffic); L. W. Ibbotson, Assistant General Manager (Modernisation); M. G. R. Smith, Chief Civil Engineer; H. E. A. White, Running & Maintenance Officer; C. J. Rider, Public Relations & Publicity Officer; S. G. Ward, Regional Establishment & Staff Officer; A. W. J. Dymond, Supplies & Contracts Manager; A. A. A. Cardani, Signal Engineer; C. W. Powell, Operating Officer;

Messrs. R. C. Hilton, Divisional Traffic Manager, Midlands Division; G. A. V. Phillips, Divisional Traffic Manager, London Division; C. T. Roberts, Principal Assistant Mechanical & Electrical Engineer;

Eastern Region: Messrs. S. G. Hearn, Assistant General Manager; T. C. B. Miller, Chief Mechanical & Electrical Engineer; E. D. Trask Assistant to General Manager (Special Duties);

London Midland Region: Messrs. David Blee, General Manager; A. E. Robson, Chief Mechanical & Electrical Engineer;

North Eastern Region: Mr. M. G. Burrows, Chief Mechanical & Electrical Engineer;

Scottish Region: Mr. J. J. Finlayson, Chief Mechanical & Electrical Engineer;

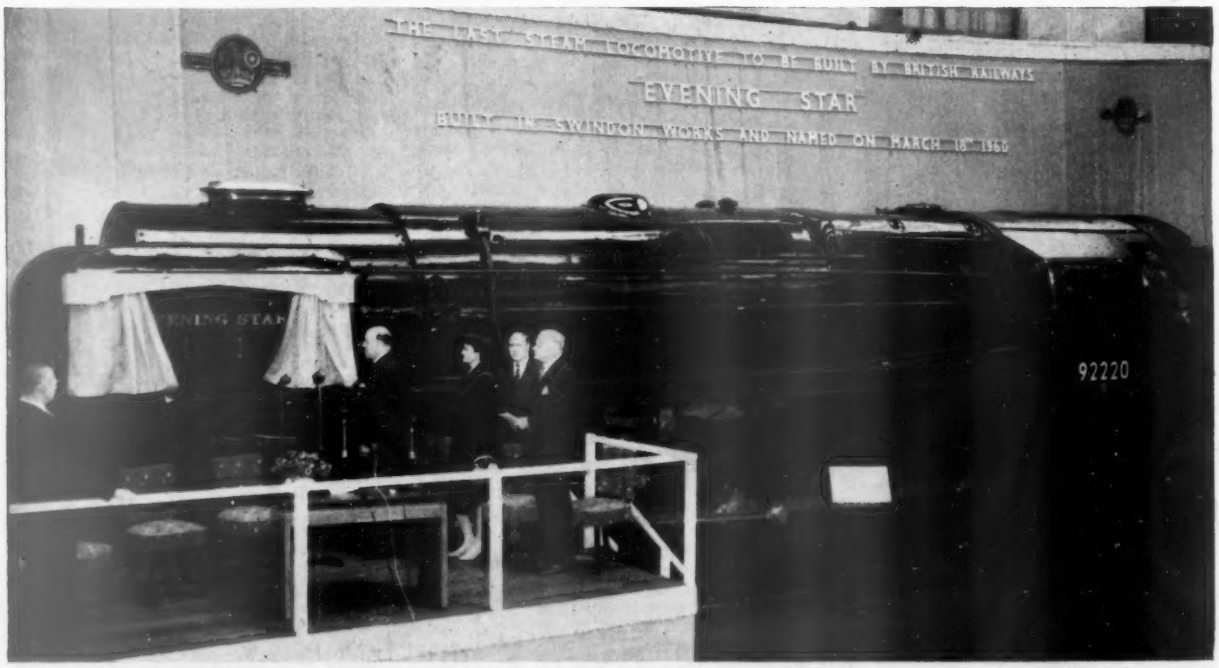
Southern Region: Messrs. W. J. A. Sykes, Chief Mechanical & Electrical Engineer; M. S. Hatchell, Mechanical & Electrical Engineer (Workshops);

London Transport Executive: Mr. A. W. Manser, Chief Mechanical Engineer (Railways);

Former railway officers: Messrs. K. J. Cook, F. W. Hawksworth, H. G. Kerry, Gilbert Matthews, W. N. Pellow, and Sir Allan Quartermaine;

Other guests: Messrs. R. Arbuthnott, D. C. Brown, B. W. C. Cooke, M. Crane, G. T. Hart, C. F. Klapper, C. E. Lloyd, W. H. W. Maass, J. S. Tritton, J. F. B. Vidal, H. Wilmot.

THE INTERNATIONAL NICKEL COMPANY OF CANADA LIMITED RESULTS.—Net earnings of the International Nickel Company of Canada Limited, and subsidiaries for the year ended December 31, 1959, were $85,157,000 U.S.A., equal to $5·83 per common share. These compare with $39,665,000 for 1958.



Mr. K. W. C. Grand naming Class "9" locomotive, "Evening Star," at Swindon works on March 18

Opening of Allen West & Co. Ltd. Laboratories

Research and investigation into the construction and performance of Allen West products

The electrical proving station and research laboratories of Allen West & Co. Ltd. were officially opened by Sir Henry Self, Chairman of the Electricity Council, at East Moulsecoomb, Brighton, last Wednesday.

The power testing station has been designed for contactor and starter load-breaking tests, both for development and proving purposes. Small circuit-breakers, up to 25 MVA. can also be tested, and a 100,000 A., three-phase transformer has been incorporated for through-fault investigations.

Test supplies are obtained from a 1,200-h.p. 5-min. rated, 1,500-r.p.m. motor-alternator arranged for alternative winding connections to give 440, 750, 850 or 1,500 V. three-phase, 50 cycles. The machine output, either direct or through a transformer delivering 3.3, 5.7, 6.6, or 11 kV., enables contactor and starter tests up to a maximum of 8.7 MVA. to be undertaken; or the alternator can be routed to two mercury-arc rectifiers giving a maximum power of 1.44 MW. at 600 V. or 1.8 MW. at 1,500 V., d.c. The motor-alternator and its exciter set are supplied from a 3.3-kV. switchboard connected *via* a 2-MVA. transformer to the 11-kV. Seeboard supply. The main motor is a slip-ring type with the rotor connected to a liquid starter *via* slip resistance. The alternator output is taken, through a master circuit-breaker and a "making" switch, into a room above containing the a.c. and d.c. loads and circuit-setting link boards. Finally, the output goes to the test cell, either direct or by way of the high-voltage test transformer or the 100,000 A. transformer.

Control and Observation

Situated next to the test cell and the reactor room is the control and observation room. The control desk next to the test cell windows, enables the operator to have not only full control of the plant but also maximum facilities for close viewing of apparatus being tested. The windows are on two sides of the test cell and are of ½-in. thick toughened glass protected, if required, by steel mesh. The control and observation room includes a sequence timer and oscillographic apparatus and is adjacent to an oscillogram processing room which enables records to be inspected dry a few minutes after the test. Normal photographic facilities are also available.

The desk combines switching controls, exciter and alternator field setting-up controls, together with, for the higher currents, decrement and field boosting adjustments. Repetitive or single test sequences can be selected, with oscillograph operation, if desired, counting of the test sequences being carried out automatically. The test can be stopped at any time from either of two positions, by opening the exciter fields and master circuit breaker simultaneously by means of a single switch movement.

Research and Development Laboratories

In the research and development laboratories, which occupy a large area of the ground floor, a main control panel 26 ft. long is set into one wall. In an adjoining motor generator room are machines to give wide ranges of voltage, current and frequency.

Power sources in the generator room are controlled through the main panel and are fed *via* a central distribution board to 25 service points throughout the laboratories where the different tests and measurements are carried out. Each of these remote points has its own facilities for the control of voltage, current and frequency. The flexibility of this distribution system enables equipment brought into the laboratories to be dealt with at any point.

Gear to be tested may be the smallest push-button control switch, or it may be oil-break switchgear weighing several thousand pounds. This heavier equipment enters through the loading bay, which has double doors to avoid temperature changes in the main laboratory.

To ensure absolute reliability in service and a performance fully in accord with the appropriate British Standard specification, each development model of Allen West manfuacture undergoes stringent tests which involve, among many other things, the observation, measurement and recording of temperature rise under full load and overload conditions; operating times and velocity of moving parts; magnetic performance; and insulation behaviour under various conditions.

Thermo-couples, electronic time interval meters, flux meters, impulse generators, and ultrasonic flaw detectors are typical of the instruments used in the foregoing measurements. Data on contact operation, electrical changes and other transient conditions is provided by either the Duddell electromagnetic or a cathode ray type of oscillograph. An adjacent dark room is used for processing these records.

A special area is set apart for high voltage insulation testing up to 120,000 V. The apparatus here includes an inverted Schering bridge to deal with loss factor measurements, an electronic peak volt meter, and an adjustable sphere gap.

Control gear must operate without undue noise, such as magnetic hum. Investigations in this connection are carried out in an anechoic chamber. Walls and ceilings throughout are lined with deep-set pyramids of perforated plastic board. The purpose of the pyramids is to minimise sound reflection which might otherwise impair the accuracy of sound level meter readings and aural investigations. A subsidiary purpose of this chamber is to detect high voltage discharges, aurally and visually, often in complete darkness.

Questions in Parliament

Finance of Nationalised Industries

Mr. J. Grimond (Orkney & Shetland—Lib.) asked the Chancellor of the Exchequer, on March 15, if, in view of the continued difficulties of the long-term market for Government loans and the accumulating deficits of the B.T.C. he would now consider a further investigation into the methods of financing the nationalised industries.

Mr. Heathcoat Amory, in a written answer: I do not see the necessity for a general investigation of this kind. As to the B.T.C., the Prime Minister, in his statement of March 10, has indicated how the Government intends to go about consideration of the financial problems of the Commission.

Investment in Nationalised Industries

Mr. Roy Jenkins (Stechford, Birmingham—Lab.) asked the Chancellor of the Exchequer, on March 15, whether he would publish earlier information on the continued future investment plans of the nationalised industries.

Mr. Heathcoat Amory: Following the recommendation of the Radcliffe Committee, it is intended to publish information about prospective public investment several months earlier than at present—in the summer of the preceding year instead of in the spring of the year to which the figures relate. This will be done in a White Paper, of which the first will be published this summer.

Mr. Jenkins: Does this mean that we shall have the Government estimates of public investment at least as soon as we now have from the Government the estimates of investment in private industry?

Mr. Amory: The effect will be that during the summer there will be issued the figures of the provisionally approved expenditure for each nationalised industry for the following year. The White Paper published this summer will give the figures for 1961-62.

Coal Wagon Shortage

Mr. Albert Roberts (Normanton—Lab.) and Mr. G. O. Sylvester (Pontefract—Lab.), asked the Minister of Transport, on March 16, to give a general direction to the B.T.C. to provide a more adequate supply of wagons for collieries.

Mr. Ernest Marples said he understood from the Commission that difficulties arose from shortages in the supply of empty wagons to collieries and opencast sites in the early part of the year, but that these had now been substantially overcome. The B.T.C. met the National Coal Board daily at regional level and weekly at national level. This showed that they are trying hard to overcome the difficulty. Difficulties had arisen recently in the supply of empty wagons to collieries and opencast sites in certain parts, particularly in the West and East Midlands and in Yorkshire. This was not due to any overall shortage of wagons but to difficulties in the movement of both loaded and empty wagons caused by shortages of staff. He would not give a general direction to the B.T.C. Supply of wagons was a matter of day-to-day management.

Staff and Labour Matters

Railway Shopmen's Wages

A resumed meeting of the Railway Shopmen's National Council in connection with claims of the Employees' Side of the council for a substantial increase in pay for railway shopmen and the introduction of a shorter working week, took place on March 21 at British Transport Commission headquarters.

When the council met on March 15, the claim for the introduction of a 40-hr. week was declined but discussions on an offer for improved rates of pay were adjourned.

No settlement was reached at the resumed meeting on March 21 because of disagreement in regard to the operative date. Union representatives are reporting to their executive committees.

London Busmen

Delegates of London busmen decided at a meeting in London on March 21 to accept the pay offer made last week by the London Transport Executive.

The increases offered are 10s. a week for drivers and conductors, 8s. 6d. for semi-skilled maintenance men, and 8s. for unskilled men.

Committee of Inquiry into Railway Pay

A meeting between the Chairman of the British Transport Commission and representatives of the three railway trade unions took place on Thursday, March 24, to discuss the report of the Guillebaud Committee on railway pay.

Contracts and Tenders

Type "4" diesel-electric locomotives for British Railways

The British Transport Commission has placed an order with the English Electric Co. Ltd. for 20 2,000-h.p. Type "4" diesel-electric locomotives for British Railways.

Electrical equipment for the 449 suburban railway coaches ordered by the South African Railways at a cost of some £10,000,000 from the Union Carriage & Wagon Co. (S.A.) Ltd., will be supplied by Associated Electrical Industries (S.A.) Limited. The cost of the electrical equipment will exceed £2,750,000.

The Swiss Locomotive & Machine Works Winterthur, has received from the Swiss Federal Railways an order covering the mechanical portions and engine-and-ancillary equipments for 45 shunting locomotives, including 35 of the standard 600 b.h.p. three-axle diesel-electric type; and a further order for the mechanical portions of another 13 shunting locomotives.

A.E.C. Limited and Simms Motor Units Limited have received an order from Vanajan Autotehdas Oy, the Finnish commercial vehicle firm, for 500 diesel engines.

British Transport Docks has placed an order with A. & J. Inglis Limited for the construction of a diesel-propelled triple-grab hopper dredger and a diesel-propelled hopper barge for use at Garston Docks, where the approach channel from the River Mersey and the docks themselves are subject to accumulations of mud, involving continuous dredging. The new dredger, which will work mainly inside the docks, will carry its own spoil to the depositing ground, and the hopper barge will be loaded by an existing bucket dredger operating in the approach channel

British Railways, London Midland Region, has placed the following contracts:

Hoveringham Engineering Co. Ltd.: supply and erection of structural steelwork for new diesel maintenance shop at Newton Heath

Francis Morton & Co. Ltd.: supply, fabrication, and delivery of steelwork for bridges 118 and 127 on the St. Pancras to Bedford line

W. H. Heywood Co. Ltd.: patent glazing in the new diesel maintenance shop at Newton Heath

The Ruberoid Co. Ltd.: supply and fixing of insulated metal roof decking and wall cladding in the new diesel maintenance shop at Newton Heath

Sir Alfred McAlpine & Son Ltd.: new power signalbox at Weaver Junction

E. B. Jones & Rawlinson Limited: reconstruction of Levenshulme, Heaton Chapel, Cheadle Hulme, Styal, Wilmslow, and Holmes Chapel Stations.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From South Australia

7 diesel-electric car body type locomotives, 5-ft. 3-in. gauge, with double end control.

The issuing authority and address to which bids should be sent is the South Australian Railways, Railways Commissioner's Office, Adelaide. The tender No. is CME.1/60. The closing date is May 19, 1960. Photo copies of tender documents are not available at the Board of Trade. The Board of Trade reference is ESB/7589/60.

From South Africa

1 set of testing equipment for electric motors in accordance with S.A.R. specification E.LAB101A12/59.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.8131: Testing Equipment" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is May 20, 1960. Local representation is essential. The Board of Trade reference is ESB/7557/60.

4 500-kVA, 88,000-V./6,600-V. three-phase transformers as per item 1 of annexure 1 of S.A.R. specification ENW.542/59

1 500-kVA 88,000-V./6,600-V. three-phase transformer as per item 2 of annexure 1 of S.A.R. specification ENW./542/59.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. C.8171: Transformers," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is April 19, 1960. Local representation is essential. The Board of Trade reference is ESB/7558/60.

100 lb. $\frac{1}{4}$ in. square spring steel silicon manganese, to S.A.R. specification C.M.E. 105/1959, in minimum lengths of 12 ft.

17,000 lb. $5\frac{1}{4}$ in. x $\frac{7}{16}$ in. flat spring steel as above.

5,000 lb. $5\frac{1}{4}$ in. by $\frac{1}{2}$ in. flat spring steel as above.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. H.4304: Spring Steel," should be addressed to the Chief Stores Superintendent, S.A.R., P.O. Box 8617, Johannesburg. The closing date is April 19, 1960. Local representation is essential. The Board of Trade reference is ESB/7559/60.

From Burma:

1 diesel locomotive engine.

The issuing authority and address to which bids should be sent is the Burma Purchase Board, St. Johns Road, Rangoon. The tender No. is IVB/242/P. & M. of 59-60. The closing date is April 4, 1960. The Board of Trade reference is ESB/7512/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

Presentation to Mr. J. H. Fraser, former Chief Signal Engineer, British Railways Central staff, by Mr. D. Murray, President of the Senior Officers' Mess.

Notes and News

British Wagon Co. Ltd. New Branch Office.—The British Wagon Co. Ltd. is opening a branch office in Middlesbrough on April 11. The address will be 3, Exchange Place, Middlesbrough, Yorks.

New Factory and Exhibition.—From May 2 to May 6 inclusive, James H. Randell & Son Ltd. will exhibit specialised sheet-metal fabrication work and storage systems on a floor of its new works at Paddington Green, London, W.2. On view for the first time will be Microstore and also Ranplan (both described in this week's "New Equipment and Processes" section) and various designs and sizes of plastic storage trays and handling equipment. A subsidiary company, Model Engineering Limited, will exhibit specialised precision-machined parts, and a new colour film—"Active Storage"—will indicate the various uses of the manufacturer's products.

Presentation to Mr. J. H. Fraser.—On March 1, Mr. J. H. Fraser, who retired recently from the post of Chief Signal Engineer, British Railways Central Staff, British Transport Commission, was presented with a cheque on behalf of his colleagues by Mr. D. Murray, President of the Senior Officers' Mess at B.T.C. headquarters. The illustration shows (left to right), Messrs. D. S. Jewell, Assistant Signal Engineer (General), British Railways Central Staff; S. J. Birch, Assistant Railway Accountant, and R. Glendinning, Assistant Director of Accounts, B.T.C.; C. W. King, Chief Civil Engineer, B.R.C.S.; A. C. West, Chief

Constable, B.T.C.; Mr. J. H. Fraser; R. B. Hoff, Chief Supplies Officer, B.T.C.; H. F. Pallant (retired), Chief Operating Officer, B.R.C.S.; D. Murray; H. L. Brazier, Assistant Secretary; D. R. Fraser, Budget Accountant (Railways), and D. M. Dear, Director of Costings, B.T.C.; J. A. Broughall, Electrical Engineer (Development) B.R.C.S.; J. Gillespie, Chief Railway Accountant, and E. J. Larkin, Director of Works Study, B.T.C.

Advertising on Buses and Station Sites.—Increased demands for double-front advertising positions on London buses and 4-sheet poster sites on British Railways stations are announced by British Transport Advertising. More boards are being provided at stations by the regions, in conjunction with British Transport Advertising, to meet the increase in popularity of the four-sheet site.

New Distributors for Albi-Willesden Limited.—Albi-Willesden Limited has recently appointed Hadfields (Merton) Limited as main distributors in the United Kingdom of Albi-R fire retardant coating. The three associate companies, Charles Morrison Compositions Co. Ltd., Zocus Compositions & Paint Limited and Foster Mason & Harvey Limited, will also act as distributors. Supplies will still be obtainable from the parent company and from its Scottish distributors, Graham & Wylie Limited, Glasgow.

Exhibition of Murex Automatic Welding Equipment.—Murex Welding Processes Limited is holding an extensive welding exhibition at the works of Specialloid Limited, Black Bull Street, Leeds 10, from April 5 to 9, 1960. The display covers a floor area of some 3,000 sq. ft. and the exhibition is being specially held to demonstrate the new Murex automatic welding equipments and the latest Murex hand welding electrodes and equipments. A comprehensive range of Ross positioning and holding equipment is also being shown.

British Waterways Seek Traffic in Sweden.—A mission from British Waterways, with an exhibition craft, is visiting Gothenburg, at the end of this month to seek traffic in Sweden. Swedish traders, shippers, and others concerned with the Anglo-Swedish trade will be invited to meet representatives and to see the exhibition which, with the co-operation of the Ellerman's Wilson Line Limited, is to be staged aboard the ss. *Cicero*. The waterways party will be in Gothenburg for about a week. It will be led by Mr. Trevor H. Thornton, British Waterways North-Eastern Divisional Manager.

Resumption of Newhaven-Dieppe Steamer Service. — The passenger steamer service operated by British Railways and the French National Railways starts again on April 1. Bookings received to date indicate a heavy summer traffic. During the winter the ships, British and French, have been overhauled. The service does not now function during the winter months, but since last November the few passengers wishing to travel by this route have been carried by the cargo steamers which run throughout the year. The passenger service will terminate for the winter on October 31. Until April 9 the boat train will leave Victoria at 8.50 a.m. and departure from Newhaven will be at 10.45, with arrival in Paris St. Lazare just after 6 p.m.; from April 10 south-bound passengers will leave Victoria at 9.30 a.m. and sail from Newhaven at 11.35. From Paris, passengers depart at 10 a.m., and arrive at Victoria at 5.27 p.m.; after April 10 the arrival time in London will be one hour later after introduction of British Summer Time. Between July 8 and September 18 there will also be a night service both ways with sleeping accommodation for passengers. For motorists there will be extra accommodation for cars at the height of the season in special cargo ships sailing in conjunction with the night steamers. It is hoped that increasing patronage will enable the service to be maintained every summer, and the British Transport Commission is anxious to develop it. The service, it is pointed out, has an appeal of its own to the public during the summer when reasonable weather means that many people do not object to the longer sea journey.

Great Central Association.—A meeting of the Great Central Association will be held on April 9 in the Welbeck Hotel, Milton Street, near Victoria Station, Nottingham, to discuss restoration of passenger train facilities on the main line of the former Great Central Railway. The Secretary of the Association is Mr. E. L. Kenworthy, 16, Nadin Road, Wylde Green, Sutton Coldfield, Warks.

London Midland Region Excursion Trains.—British Railways, London Midland Region, announces that, after a careful review of the freight traffic situation, a full programme of excursion trains will run throughout April except for the following:—Saturday, April 2, Walsall to Coventry, Coventry to Burslem; Saturday, April 9, Birmingham to Blackpool, Birmingham to Manchester; Sunday, April 10, Wolverhampton to St. Albans; Sunday, April 17, St. Pancras to Sheffield, St. Pancras to Nottingham.

Davies & Metcalfe Limited Results.—In addition to raising the total distribution from 20 per cent to 25 per cent for 1959, Davies & Metcalfe Limited proposes a one-for-two scrip issue. With the final dividend of 12½ per cent there is a bonus of 5 per cent (nil). The net profit of £44,819 compares with £30,211, to which is added a tax adjustment of £3,770. After placing £20,000 (£10,000) to general reserve, £64,874 (£51,598) is carried forward.

International Pipes & Pipelines Exhibition.—The sponsors of the first International Pipes & Pipelines Exhibition, to be held at Earls Court, London, from May 30 to June 2, have now reserved 28,000 sq. ft. of stand space. Besides exhibitors who will be showing different types of pipe materials, many stands will show ancillary equipment such as insulation, protection, testing and welding equipment, also fabricated pipework, pumps, valves and fittings. Details and tickets are obtainable from the organisers, Scientific Surveys Limited, 97, Old Brompton Road, London, S.W.7.

British Wagon Co. Ltd. Edinburgh Office.—The Edinburgh branch of the British Wagon Co. Ltd. moved to 4, Chester Street, Edinburgh, 3, on March 7.

North Eastern Region Car-sleeper Folder.—The car-sleeper folder produced in 1958, by the Public Relations & Publicity Officer, British Railways, North Eastern Region, has been selected as one of the best examples of advertising design and a photograph of the cover has been reproduced in the 1959-60 issue of "*Modern Publicity*." The cover was designed by Studio-Seven Limited, London, and the folder printed by W. W. Curtis Limited, Coventry, by the letterpress process. The cover was selected from 12,000 entries submitted by 34 different countries.

Travelling Exhibition.—Illustrated on this page is a rail coach provided and adapted by the Western Region of British Railways as a travelling exhibition for Calidec Limited of Solihull. The exhibition, which features a number of the company's electric heating products, toured towns and cities in industrial areas.

Forthcoming Meetings

March 30 (*Wed.*).—Royal Society of Arts at John Adam Street, Adelphi, W.C.2, at 2.30 p.m. Paper on "The structure and organisation of the transport system," by Mr. Gilbert J. Ponsonby, Sir Ernest Cassel, Reader in Commerce (with special reference to transport), London School of Economics. Lord Chesham, Joint Parliamentary Secretary, Ministry of Transport, will preside.

April 2 (*Sat.*).—Permanent Way Institution, York Section. Visit to B.T.C. Engineering Research Laboratories, Derby.

Rail coach converted by the Western Region of British Railways as an exhibition (*see paragraph on this page*)

April 2 (*Sat.*).—Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Paper on "Locomotives of the S.E. & C.R.," by Mr. D. L. Bradley.

April 2 (*Sat.*).—Railway Correspondence and Travel Society, Sussex & Kent Branch, at the Railway Hotel, Brighton, at 7 p.m. "The branch lines of the L.B.S.C.R.," by Mr. O. J. Morris.

April 4 (*Mon.*).—Institute of Transport, at the Jarvis Hall (R.I.B.A.), 66, Portland Place, W.1, at 5.45 p.m. Annual Shipping Lecture. "The future development of merchant ships," by Mr. R. Stewart MacTier, Director, Alfred Holt & Company.

April 4 (*Mon.*).—Institute of Transport, Metropolitan Section, at 80, Portland Place, W.1, at 5.30 for 6 p.m. Paper on "Electronics and transport," by Mr. G. H. Hinds, Electronics Advisory Officer, British Transport Commission.

April 6 (*Wed.*).—Permanent Way Institution, London Section, at the Headquarters of British Transport Commission, 222, Marylebone Road, N.W.1, at 6.30 p.m. Paper, illustrated, on "Track maintenance on the Swedish State Railways," by Mr. P. J. Ebling, Corresponding Secretary, Notts & Derby Section.

April 6 (*Wed.*).—Institution of Railway Signal Engineers, at the Institution of Electrical Engineers, Savoy Place, W.C.2 at 6 p.m. Annual general meeting.

April 6 (*Wed.*).—Electric Railway Society, at the Fred Tallant Hall, 153, Drummond Street, London, N.W.1, at 7.15 p.m. Paper on "Hamburgh electric railways," by Mr. R. Copson.

April 6 (*Wed.*).—Royal Society of Arts, at John Adam Street, Adelphi, W.C.2, at 2.30 p.m. Paper on "The hovercraft and its place in the transport system," illustrated, by Mr. Christopher Cockerell. Mr. R. A. Shaw, Assistant Director, Aircraft Research, Ministry of Aviation, will preside.

April 7 (*Thu.*).—Diesel Engineers & Users Association, at the Connaught Rooms, Gt. Queen Street, W.C.2. Annual luncheon.

April 7 (*Thu.*).—Institute of Traffic Administration, London Centre, at Caxton Hall, Westminster, S.W.1, at 7.15 p.m. Paper on "Railway goods depot operation," by Mr. J. H. Leaves.

April 9 (*Sat.*).—Railway Students' Association. Visit to Peterborough and Cambridge. Leave King's Cross Station by 8.20 a.m. train.

April 9 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Cambridge, at 2.15 p.m. Paper, illustrated, on "The reconstruction of Temple Mills Marshalling Yard," by Mr. E. R. Newens, Assistant District Engineer, Stratford, Eastern Region.

OFFICIAL NOTICES

RHODESIA RAILWAYS. Vacancies for Signals and Communications Engineers. Vacancies exist on the Permanent Staff for Signals & Communications Engineers for service in the Chief Engineer's Department of the Rhodesia Railways.

Preference will be given to applicants who have had previous experience in the design, installation and maintenance of modern colour light signalling and/or telecommunication systems with a Railway Administration or with a firm of equipment manufacturers.

Applicants should hold a degree in Electrical Engineering at a recognised University or be Corporate Members of the Institution of Electrical Engineers. Applicants who have passed Parts I and II of the Institution examinations will be considered for appointment to the grade of Technical Assistant until such time as they become Corporate Members and are, therefore, eligible for transfer to the Professional Grade. Successful candidates will be expected to become Corporate Members of the Institution of Railway Signal Engineers in due course.

The salary scale for Assistant Engineers is £1,000 to £1,800 per annum, plus a Cost of Living Allowance at present calculated on 12 per cent of the basic salary, subject to a maximum of £13 15s. per month. The commencing salary will depend upon previous experience of applicants. The annual increments in the above scale are as follows :—

£1,000 x £100 to £1,200
£1,200 x £50 to £1,500
£1,500 x £100 to £1,800

Further advancement to the grade of District Signals and Communications Engineer on the salary scale £1,800 x £100 to £2,100 is possible as and when vacancies occur. Promotion to these posts is by selection.

Membership of the Contributory Pension Fund and Medical Fund is obligatory and the usual Railway privileges in respect of travelling concessions, leave, etc., will apply.

Income Tax in the Federation is not unreasonable and at the present time, a married man with one child, earning £1,100 per annum, would not be liable.

Housing is provided at a moderate rental for married Engineers; the rental payable is £7 10s. per month for Officers in receipt of a salary under £1,700 per annum, and £10 per month for Officers in receipt of higher salaries.

Full particulars with regard to age, training, qualifications and experience should be submitted together with copies of recent testimonials to: The London Agent, Rhodesia Railways, 241, Salisbury House, London Wall, London, E.C.2, from whom full details regarding conditions of service may be obtained.

THE HIGH COMMISSION OF INDIA, LONDON.

APPLICATIONS are invited for one post of Leading Draughtsman (Engineering) to work in the Railway Adviser's Department, Acton, W.3.

The current salary scale for the post is £865 x £30—£1015 per annum. Candidates should be of Indian nationality, not less than 26 years of age, and have had a minimum period of seven years' experience in a drawing office with special reference to locomotives, carriage and wagon, cranes and rolling stock equipment.

Terms and conditions of appointment and forms of application may be obtained from Establishment Department (Branch I), India House, Aldwych, London, W.C.2. (TEMple Bar 8484).

The last day for receipt of applications is April 9, 1960.

ENGINEERING DRAUGHTSMEN. Applications are invited from Engineering Draughtsmen to fill positions in a Company engaged in the manufacture of steel castings, forgings, engineering equipment and railway trackwork.

Applicants should have had drawing office and design experience in any of the above spheres, and should also possess technical qualifications of at least the Ordinary National Certificate in Mechanical Engineering.

Five day week, pension scheme, staff dining and welfare facilities available.

Reply, stating age, experience and salary required, should be addressed to the Personnel Manager, Messrs. Hadfields, Ltd., East Hecla Works, Vulcan Road, Sheffield, 9.

THE REPUBLIC OF THE SUDAN

APPLICATIONS are invited from those suitably qualified to fill a vacancy as Senior Mechanical Engineer in the Sudan Railways.

Candidates must be fully qualified Mechanical Engineers in theory and practice, have graduated in Mechanical Engineering and/or must be a Corporate Member of the Institute of Mechanical Engineers and have served a full apprenticeship on railways or with a firm of locomotive builders of repute and have held a position of responsibility on locomotive engineering of not less than 15 years. Should be familiar with steam and diesel electric locomotives from both maintenance and running points of view.

Should have experience on progress work full control and piece work. Appointment will be on contract, with bonus, for a period of three years determinable at any time by three months notice on either side. Bonus of one month's salary will be paid for each year of satisfactory service.

Salary range £S.1750-£S.2170 with annual increments. Starting rate will be fixed according to age, experience and qualifications. £S.1 equals £1 0s. 6d. sterling.

Age limit 40-55 years.

A cost of living allowance is payable—the present rate being £S.187 per annum. An outfit grant of £S.50 is payable on appointment.

Annual leave after the first tour.

At the present time there is no income tax in the Sudan.

Write for further particulars and application forms to: Appointments Section, The Sudan Embassy, Cleveland Row, St. James's, London, S.W.1, quoting reference L.E.7-4/1936. Closing date April 30, 1960.

DRAUGHTSMAN required with knowledge of Railway Switch and Crossing Work. Excellent prospects. Apply in confidence giving details of age, experience, qualifications, and salary required, to The Secretary, Isca Foundry Co., Ltd., Newport, Mon.

Railway Stock Market

Although firmer, and more active, stock markets continued to display a good deal of uncertainty because of conflicting views about the coming budget. If there is no unexpectedly heavy increase in taxation, the indications are that industrial shares will move strongly ahead, bearing in mind that financial results from companies in a wide range of industries are showing record profits and higher dividends. The results of Imperial Chemical Industries Limited, which were due to be published this week, have been eagerly awaited.

Changes in foreign rails were small and unimportant, and in most cases quotations were scarcely tested by dealings. Costa Rica ordinary stock was again inclined to strengthen, and at 31, compared with 30½ a week ago, while the first debentures remained at 90 and the second debentures held their recent rise to 94½. United of Havana consolidated stock, which last week changed hands down to 12s. 6d., has been dealt in up to 20s.: the second income stock was again quoted at 6.

Sao Paulo Railway 3s. units at 1s. 6d. were also unchanged, and Brazil Railway bonds kept at 8, but in other directions, Mexican Central "A" bearer debentures was fractionally lower at 59.

Chilean Northern first debentures at 58, Paraquay Central prior debentures at 15½ and Guayaquil & Quito assented bonds at 77, were all unchanged compared with a week ago.

Antofagasta ordinary stock showed a fair number of dealings, but at 13½ was unchanged on balance, as was the preference stock at 29, while the 5 per cent (Bolivia) debentures was again 100; but in other directions, International of Central America eased from $24½ to $23 and the preferred from $111½ to $108½.

Canadian Pacifics strengthened slightly to $44¾, but both the 4 per cent preference stock and 4 per cent debentures lost a little ground at 56½ and 64 respectively.

Nyasaland Railways shares kept at 10s. and the 3½ per cent debentures remained at 50½.

In other directions, Midland of Western Australia ordinary stock marked 5. Barsi stock was quoted at 29 and West of India Portuguese remained at 112 with the 5 per cent debentures 94½.

After news of the loss for the year's working which was not unexpected, North British Locomotive shares fell to 10s. 3d., but later rallied to 10s. 9d.

G. D. Peters shares fell very promptly to 18s. 9d. on the results and cut in dividend from 10 per cent to 5 per cent. Birmingham Wagon shares firmed up a few pence to 41s., and Charles Roberts 5s. shares held steady at 15s.

Gloucester Railway Carriage & Wagon 10s. shares remained at 13s. 6d. to which they declined following news of the reduction in the interim dividend. Wagon Repairs 5s. shares kept at 11s. 9d. and elsewhere, Beyer Peacock 5s. shares strengthened from 8s. 1½d. to 8s. 4½d.

Westinghouse Brake moved up from 49s. 9d. a week ago to 51s. English Electric at 44s. 6d. showed a rise of 4s. 6d. on balance, while Associated Electrical at 56s. 3d. and General Electric at 39s. 6d. were also better on balance with the prevailing trend of markets.

Crompton Parkinson 5s. shares tended to hold steady at 13s. 1½d.

Ransome & Marles 5s. shares were 25s.xd. Pollard Bearing 4s. shares 43s. 9d. and Pressed Steel 5s. shares moved up from 38s. 6d. to 42s. 6d.

Ruston & Hornsby recovered from 27s. 9d. to 30s. and Dowty Group 10s. shares rose from 54s. 9d. to 57s. 9d.